Technical Special Provisions
For Bay County Traffic Engineering

Prepared for:

Prepared by:

GENESIS GROUP
2507 Callaway Road, Suite 100
Tallahassee, Florida 32303
(850) 224-4400

August, 2010

Bay County TSP

Table of Contents

Intersection Component List 1

General Notes 3

Traffic Management Center (TMC) Equipment 5

- Video Decoder 6
- Video Monitor 9
- Video Switch 12
- Web Server Blade 15

Field Equipment 18

- Traffic Cabinet 19
  - Pad Mounted Cabinet 20
  - Controller 31
  - Fiber Optic Patch Panel 37
  - UPS Power Supply 41
  - Network Switch 51
  - Video Encoder 58
  - Video Surge Protection 61
  - Pole Mount Cabinet 64
  - Data Surge Protection with Base 67
  - Low Voltage Power Protection 70
- Camera 73
  - Dome Color Camera 74
  - Video Surge Protection 77
  - Mounting Bracket 80
- Video Detection 82
- Signal Equipment 83

Intersection Component List

Field Equipment

Traffic Cabinet

Pad Mounted Cabinet	Siemens Eagle EL 712 with Front and Back Doors
Controller	Siemens m50 Series Traffic Controller
Fiber Optic Patch Panel	Corning Cable Systems Wall-Mount Housing (WCH)
UPS Power Supply on separate mounting pad	ALPHA Novis FXM-1100
Network Switch	RuggedSwitch™ RS900
Video Surge Protection	Edco CX06-M
Pole Mount Cabinet	McCain 336 Controller Cabinet
Data Surge Protection with Base	EDCO PC642 Series
Low Voltage Power Protection	FAS-1-043HC Edco 2
Fiber Optic Cable	Corning Dry Dielectric

Camera

Camera Cabinet on separate pad	McCain 336s Controller Cabinet
Video Encoder	impath i4100 - FDOT APL #78461401214011
Dome Color Camera	SVFT-PRS35w Vicon 1
Video Surge Protection	EDCO CX06-MI
60 ft. Composite Cable Assy.	BH-CCTV-60-CONN Blackhawk 1
230 ft. Composite Cable Only	BH-CCTV-230
Power supply for dome and adapter for dome	PRO-SCP-1
Parapet Mount	Pelco PP450
Astro Bracket	Pelco Astro-Brac – Part No. AB-3009-L

*Must include Impath Decoder USG-1100 (w/15' video cable with BNC connectors)

Video Detection

Iteris Video Detection Unit
Vantage Edge 2 2N processors per camera
TS 2 IM BIU extension module
Edge connect
RZ4 Advance color cameras
Pelco mast arm brackets
9" black/white video monitor
Iteris DIN rail surge panel

Signal Equipment

Vehicular Traffic Signal	FDOT Approved Product List
Signal Head Back Plate (Required on East/West Signals)	FDOT Approved Product List
Signal Head Pedestal	FDOT Specification
Signal Head Bracket Extension Pole	FDOT Specification
Countdown Pedestrian Signal	FDOT Approved Product List
Pedestrian push buttons	Polara Engineering, Inc. Bulldog LED
Illuminated Street Name Sign	FDOT Approved Product List
Vehicle Loop Assembly (only if approved by Engineer)	FDOT Specification
Vehicle Loop Detector (only if approved by Engineer)	Eberle Design Inc.(EDI)
Pull Box	FDOT Approved Product List
Pull Box (Fiber Optic)	FDOT Approved Product List
Conduit	FDOT Specification
Signal Cable	FDOT Specification
Electrical Power Supply Assembly	FDOT Approved Product List
Interface Panel	Siemens Eagle
Mast Arm Poles (Galvanized)	FDOT Approved Product List
DMS Cabinet (Type 336) Sign Structure Mounted	FDOT Approved Product List
Dynamic Message Sign	Daktronics FDOT APL
Grounding Arrays	FDOT Specification per ATMS Phase II Plans

TECHNICAL SPECIAL PROVISIONS

FOR THE

BAY COUNTY

ADVANCED TRANSPORTATION MANAGEMENT SYSTEM

These Technical Special Provisions (TSP) expand the current Florida Department of Transportation's Standard Specifications for Road and Bridge Construction in areas as described in this document. Any area not covered by these technical special provisions shall be referenced to the Florida Department of Transportation's Standard Specifications for Road and Bridge Construction and the District Three (3) TSP'S. These technical special provisions are to replace any previous specifications or special provisions of Bay County Traffic Control System Field Equipment.

GENERAL NOTES

1. **Traffic Control Assemblies**: All Traffic Controller Assemblies SHALL meet the conditions of these Technical Special Provisions for use within the Bay County Traffic Signal Systems.

2. **Electrical Services:** Any Signalized Intersection(s) within Bay County that requires a new electrical service to be built or replaced SHALL require the Contractor to secure all permits. The Contractor shall be required to coordinate with the County and set up the utility account that is to be transferred to the City or County. After FINAL acceptance and the maintenance turned over to the City or the County, the City or County shall be responsible for payment of electrical power consumed.

3. **Controller phasing of the intersection:** The controller phasing of the intersection(s) shall conform to the following: Roadways where the major street is in the north-south orientation, controller phase 2 **SHALL** be north bound as the traffic flows. On a roadway that the major street is in the east-west orientation, then controller phase 2 **SHALL** be west bound as the traffic flows. Any roadway that has one leg of the major movement in more of a north-east or north-west orientation, then that roadway shall be deemed to be a north-south roadway. Likewise, if one leg of the major movement is more in a north-west to south-west orientation, then that roadway shall be deemed to be an east-west roadway.

4. **Signal Cable Color Codes:** The Contractor shall coordinate all Signal Cable Color Codes with the Traffic Superintendent (850/784-4071).

5. **Fiber Optic Conduit:** The conduit shall have a #12 or larger copper wire installed for the purpose of locating the fiber cable. This pull wire shall be bonded together at all pull boxes.

6. **Fiber Optic Specifications:** Fiber optic cable must comply with Phase I ATMS Specifications. All cable must have dry dielectric and match exact Phase I dimensions. All specifications of the fiber optic cable to be used in this project are Corning ALTOS Dry Dielectric.

7. **Large Pull Boxes:** There shall be large pull boxes as described in FDOT Specs. installed at least every 1200 feet throughout the length of the duct line. (36" x 48")

8. **Vehicle Loop Detection:** In the design stage of a project, the design engineer shall provide video detection equipment in lieu of replacement of the vehicle loops at an intersection. Any Video Detection System on the Approved Products List of the State of Florida with a current Certificate of Conformance certificate (COC) and that conforms to the rack mount or size requirements of Bay County Controller Assemblies shall be approved for use in Bay County. Bay County currently uses and prefers an Iteris system. Should another brand of equipment be selected and approved by the Engineer for use in the field, then the first system shall include all equipment and software plus 40 hours of training necessary to set up, modify and use the system. The video detection set up equipment shall become the property of the FDOT or Bay County depending upon the funding of the intersection equipment at the completion of the project. All Field equipment shall be considered the assets of the intersection and shall be included in the normal maintenance of the intersection.

9. **Destruction of Vehicle Loops:** All existing Traffic Signal intersections that have the Traffic Signal Loops Cut or Destroyed due to construction, the Contractor shall notify the Traffic Engineer of cutting or destruction at least twenty-four (24) hours in advance of such destruction. The Contractor **shall** install a Video Detection System and **shall** have operational within thirty-six (36) hours of said destruction.

11. **Video Detection:** In the case where a video detection system is employed, the contractor may elect, if approved by the FDOT and Bay County Traffic, to transfer ownership of all such detection equipment at the completion of the project in exchange for eliminating restoration of traffic signal loops at subject intersection.

12. **Traffic Signal Heads:** All Traffic Signals Heads shall employ the use of LED's (Light Emitting Diodes). The colors shall be as approved by the Florida Department of Transportation.

13. **Training:** Arrange for at least twenty-four (24) hours of training sessions in the Bay County Traffic Engineering Division for the maintenance personnel of the County and of any personnel from the Florida Department of Transportation as recommended by the Traffic Operations Engineer from District Three. The training sessions will cover controllers, fiber optic modems, telemetry transceivers or any other specialized equipment that may be furnished with the installation of a traffic signal/camera location. This school will be scheduled within 60 days following the delivery of equipment. There shall be no tuition charge for the participants to attend these sessions. Expenses involving travel, meals and lodging shall be sustained by the attending personnel. The vendor shall have materials available for a minimum of six participants.

14. **Burn-in Period:** Once construction of a traffic signal has been satisfactorily completed, the burn-in period begins. Contractors will be required to respond within two (2) hours to any malfunction during the burn-in period. Contractor shall provide (3) sets of as built plans before final acceptance of the signal (no exceptions).

Traffic Management Center (TMC) Equipment

Video Decoder

impath networks

the i-Volution™ 1000

HARDENED ENCODER/DECODER

The i-Volution 1000 (i1000) Video-over-IP networking solution provides dual channel transport capability for advanced surveillance applications requiring high resolution, full motion video. The i1000 can encode or decode two MPEG-1/MPEG-2 video streams and two serial data channels over standards-based IP networks. The MPEG video streams can be viewed simultaneously from any PC and/or CCTV monitor in the network.

The i1000 is available as a stand-alone dual port video encoder or dual port video decoder.

The i1000 is available as a dual port Encoder or Decoder.

applications

- Security Surveillance
  - Airports
  - Military
  - Industrial Complexes
  - Hospitals
  - Campuses
  - Detention Centers
  - Residential
- Transportation Monitoring
  - Road (ITS)
  - Rail/Light Rail
  - Subway/Metro
- Industrial Process Control

High Resolution - Full Motion Video

Impath Networks i1000 provides the highest digitized video quality over standard IP Ethernet networks. Every image is encoded in real-time and displayed at 30/25 (NTSC/PAL) frames per second. This advanced capability provides full motion DVD quality video for digital CCTV surveillance applications.

Dual Channel Capacity

The i1000 provides dual-channel video connectivity for surveillance applications supporting two video cameras or monitors co-located within close proximity. The two serial data ports provide additional support for PTZ, NMS and POS applications.

Network Scalability and Flexibility

The i1000 complements the i-Volution product family with enhanced scalability and functionality at the edge of the network. The stand-alone i1000 Encoder/Decoder is ideal for a multitude of surveillance applications requiring dual channel capability and high quality full motion video.

Advanced features such as On-Screen-Display (OSD) allow network administrators to display camera name, date, time, resolution, bit rate and other related information on to any video monitor in the network.

Enhanced IP Multicast Capability - Video & Data

i-Volution simplifies network connectivity via standards-based multicast technology for streaming video and data within an IP network. IP Multicasting provides the ability to distribute information efficiently to an unlimited number of remote locations via a single communications interface at the central site. This flexibility reduces hardware and bandwidth requirements while optimizing the overall network.

Standards Compliant

Video is encoded using standard MPEG-1/MPEG-2 compression. The video stream(s) can be viewed by Impath software/hardware decoders and/or 3 Party products. The video and serial data can be transmitted over any standard IP network. This includes Ethernet, Gigabit Ethernet, SONET/SDH and ATM networks.

Network Manageability

The i1000 can be managed both locally and remotely using Telnet, i-Volution NMS or via 3 Party SNMP network management systems.

Temperature Hardened

The i1000 is environmentally hardened to operate over extended operating ranges and is conformal coated to ensure maintenance free operation.

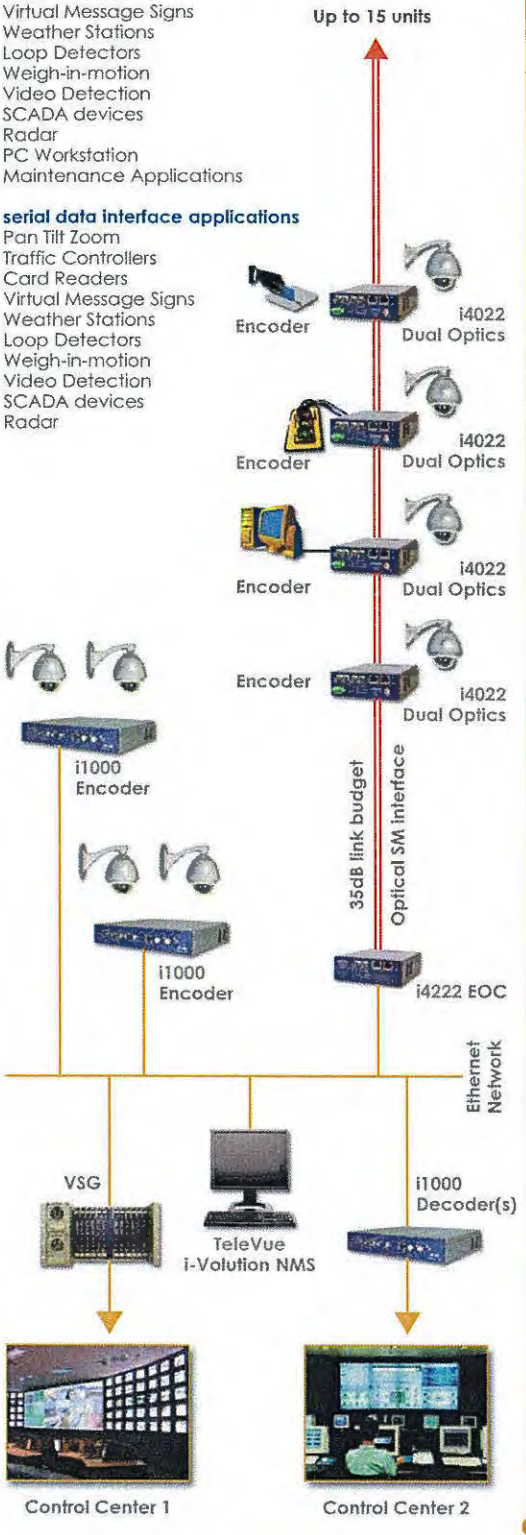
Class B Emissions Certification

Compliance with EN55022 and FCC Class B emission standards make the i1000 an ideal solution for both commercial and residential surveillance applications.

the i-Volution™ 1000
HARDENED ENCODER/DECODER

ethernet interface applications
Pan Tilt Zoom
Traffic Controllers
Card Readers
Virtual Message Signs
Weather Stations
Loop Detectors
Weigh-in-motion
Video Detection
SCADA devices
Radar
PC Workstation
Maintenance Applications

serial data interface applications
Pan Tilt Zoom
Traffic Controllers
Card Readers
Virtual Message Signs
Weather Stations
Loop Detectors
Weigh-in-motion
Video Detection
SCADA devices
Radar



Video

Analog Video	NTSC (30 fps), PAL (25 fps)
Channels	2
IP connectivity	Unicast and Multicast (UDP)
Connector	BNC, 75 ohm
Digital Encoding	MPEG-1 (ISO/IEC 11172-2) and MPEG-2 (ISO/IEC 13818-1 Transport Stream or ISO/IEC 13818-2 Elementary Steam) MP@ML
Data Rate	128 kbps to 8 Mbps aggregate in Transport Stream and up to 12 Mbps aggregate in Elementary Stream
Digital Decoding	Decoder automatically detects incoming MPEG-1/2 TS or ES stream
Data Rate	128 kbps to 12 Mbps aggregate in both Transport and Elementary Stream

Resolution	NTSC	PAL
Full	720 x 480	720 x 576
HHR	352 x 480	352 x 576
SIF	352 x 240	352 x 288
QSIF	192 x 128	160 x 128

Latency: 170ms with Optimal Setting

Data

Format	Serial / Asynchronous
IP Connectivity	Unicast and Multicast (UDP)
Channels	(2)
Connectors	DB9-F
Interface	EIA-232/422/485 - 2/4 Wire, Half/Full Duplex, Software Programable
Data Rate	300bps to 115.2 kbps

LAN

Format	IEEE 802.3 Ethernet
Channels	(1)
Connector	RJ45
Interface	10/100 Base-T Ethernet, Half/Full Duplex, Auto-Sensing
Data Rate	10/100 Mbps
Protocol	TCP, UDP, IPv4, IGMPv2, RTP, Diffserv, SAP, SNMPv2

Motion Detection

Zone	Full Screen
Sensitivity	User Selectable: Low to High (1 to10)
Re-Arm Delay	User Selectable:100ms to 25 seconds

Alarms

Via NMS/SNMP	Video Loss Detection Video Motion Detection Unit Configuration Change / Unit Reset

Management

Local Management	Via Serial (Console) Maintenance Port, LED Status Display
Remote Management	Via i-Volution NMS (TeleVue), Telnet, SNMPv2
Software Updates	Via Network Download - One or multiple units simultaneously

Power

Input Voltage	11.4 - 12.6 V DC (.100" center pin diameter lock type connector.)
Consumption	i1000-E = 15 W; i1000-D = 7 W

Physical

Size	W 9.1" (23.1 cm) x H 1.72" (4.37 cm) x L 9.1" (23.1 cm)
Weight	2 lbs (.9 kg)

Environmental

Operating Temperature	-34°C to +74°C
Relative Humidity	5% to 95%, Non-Condensing
Environmental Protection	PCB Conformal Coating

Regulatory Approvals

Emissions	
Europe	EN55022: 1998, EN61000-3-2: 1995 & EN6100-3-3: 1995 Class B
North America	FCC47 CFR Part 15, Subpart B: 1999 Class B
Australia/New Zealand	AS/NZS 3548: 1995 for Class B
Immunity	EN55024

Variant	MPEG-1 & 2	# of Video ports	# of Data ports	# of Ethernet ports
i1000-E	Encoder	2	2	1
i1000-D	Decoder	2	2	1

impath networks

Impath Networks Canada Corporation 42 Payzant Avenue, Suite 100, Halifax, NS Canada B3B 1Z6
T: 902-468-1010 F: 902-468-1044 impathnetworks.com

Impath Networks Ltd. 9 Camelot Drive, Suite 100, Ottawa, ON Canada K2G 5W6
T: 613-226-4000 F: 613-226-4602 impathnetworks.com

Copyright 2008 Impath Networks Canada Corporation. Impath is a registered trademark of Impath Networks Canada Corporation. TeleVue, ClientVue and i-Volution are trademarks of Impath Networks Canada Corporation All other trademarks are those of their respective owners. Printed in Canada - 10/08. Specifications subject to change without notice or obligation. 06mbr_132_100_i1000_09.pdf

Video Monitor

400UXn
460UXn

40" and 46" Professional LCD Displays

- Ultra-thin 11mm bezels (.43") create virtually seamless video walls
- Built-in PC with Windows XPe eliminates need for separate media player to run content
- 700 cd/m² brightness with brightness sensor and 5,000:1 dynamic contrast allows placement in even the brightest areas
- Improved panel cooling allows over 20 hours a day usage
- Samsung's proprietary content management software MagicInfo™ Pro supports both downloading and streaming of files from multiple content servers, with WAN and LAN networkability
- Exclusive DNIe™ Pro image enhancement technology provides unsurpassed color and detail

imagine your information or your sales message, big and bright for all the world to see. The Samsung 400UXn and 460UXn 46" public information displays feature an ultra-thin 11mm bezel (less than 1/2") for virtually seamless and distortion-free video walls of up to 5 x 5 (up to 25 monitors). They also feature a built-in CPU, so you don't need a separate media player to run content. And you'll be able to display impressive-looking content over 20 hours a day, thanks to advanced cooling technology and lower operating temperatures. With the Samsung 400UXn and 460UXn 46" displays, it's not hard to imagine.

400UXn
460UXn

40" and 46" LCD Large-Panel Displays

Features

Ultra-Thin Bezels
Ultra-thin bezels of just 11mm (.43") mean video walls will be virtually seamless.

Huge Video Walls
Create impossible-to-ignore video walls up to 5 monitors wide by 5 monitors high. Natural Mode correction compensates for the bezel, for distortion-free displays.

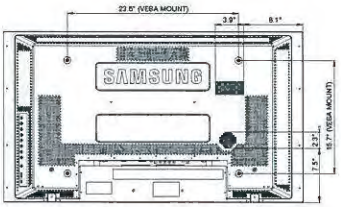
Built-In PC
The built-in PC utilizes Windows XPe to eliminate the need for a separate media player to run content.

MagicInfo™ Pro
Samsung's proprietary content management software MagicInfo™ Pro supports both downloading and streaming of files from multiple content servers, with WAN and LAN networkability

High Brightness and Contrast
Industry-leading 700 nits brightness, a brightness sensor that adjusts to ambient light, and a 5,000:1 dynamic contrast that adjusts intensity based on the picture allows placement in even the brightest locations.

Built for Continuous Use with Reliability
Improved heat protection and dissipation plates lead to temperatures up to 7°C lower than before, for more than 20-hours-a-day operation and longer component life.

Dimensions 460UXn



Specifications		400UXn	460UXn
Panel	Diagonal Size	40"	46"
	Type	S-PVA (DID)	S-PVA (DID)
	Resolution	1366 x 768	1366 x 768
	Pixel Pitch (H x V)	0.648 x 0.648	0.7455 x 0.7455
	Brightness (Typical)	700 cd/m²	700 cd/m²
	Contrast Ratio	1200:1	1200:1
	Dynamic C/R	5000:1	5000:1
	Viewing Angle (H/V)	178°/178°	178°/178°
	Response Time (G-to-G)	8ms	8ms
	Color Space (CIE1931)	72%	72%
Connectivity	PC Inputs	VGA/DVI/BNC	VGA/DVI/BNC
	Video Inputs	CVBS/S-Video/Component/HDMI	CVBS/S-Video/Component/HDMI
	Network	O (MagicInfo Pro)	O (MagicInfo Pro)
	Speaker (Optional)	10W x 2	10W x 2
Power	Power Consumption (Max)	280W	330W
	Power Consumption at Stand-by (Max)	1W	1W
	Power Supply	AC 100 - 240 V~ (+/- 10%), 50/60 Hz	AC 100 - 240 V~ (+/- 10%), 50/60 Hz
Mechanical Spec	VESA Mount	600 x 400mm	600 x 400mm
	Cabinet Color No	Black	Black
	Weight (Set/Package)	47.4 lbs./61.7 lbs.	65 lbs./81.6 lbs.
	Dimension (W/O Stand)	36" x 20.7" x 4.6"	41.3" x 23.7" x 4.6"
	Dimension (With Stand)	36" x 23" x 12.2"	41.3" x 26.1" x 12.2"
	Packing Dimension	40" x 25.7" x 11.8"	45.5" x 28.9" x 12.8"
	Bezel Width	11	12.5
Operation	Operating Temperature (Normal)	0°~ 40°	0°~ 40°
	Humidity	10~80%	10~80%
	Regulations	Safety UL (USA): UL 1950 CSA (Canada): CSA C22.2 No. 950 EMC FCC (USA): Part 15, Subchaptyer J, Class B	Safety UL (USA): UL 1950 CSA (Canada): CSA C22.2 No. 950 EMC FCC (USA): Part 15, Subchaptyer J, Class B
	Color Enhancement	DNIe Pro	DNIe Pro
Feature	Special Features	- Lamp Error Detection - Brightness Sensor - Temperature Sensor - Built in Fan - IR In/Out - RS232C	- Lamp Error Detection - Brightness Sensor - Temperature Sensor - Built in Fan - IR In/Out - RS232C
Network	Operating System	Window XP Embedded	Window XP Embedded
	CPU	AMD Athlon64 X2 3400+ (1.8GHz, Dual Core)	AMD Athlon64 X2 3400+ (1.8GHz, Dual Core)
	N/B	ATI RS690T	ATI RS690T
	S/B	ATI SB600	ATI SB600
	GPU	ATI RS690T	ATI RS690T
	FDM	4GB	4GB
	Memory	SEC DDR2 512MB	SEC DDR2 512MB
	Ethernet	Marvell 88E8055 Gigabit LAN	Marvell 88E8055 Gigabit LAN
	Audio Codec	Realtek ALC2622	Realtek ALC2622
	MagicInfo features	-Contents Play (Photo, Movie, Music, Offices, PDF, Flash, Web Page, Text, Input sources) -Contents scheduler -MDC via Networkx -Diagnosis (Lamp, Temperature, Fan, etc.) -Network System information -Asset management -Global Network	-Contents Play (Photo, Movie, Music, Offices, PDF, Flash, Web Page, Text, Input sources) -Contents scheduler -MDC via Networkx -Diagnosis (Lamp, Temperature, Fan, etc.) -Network System information -Asset management
Optional items	Speaker	SP-L400DB(S)	SP-L460DB(S)
	Wall Mount	WMN-5770D	WMN-5770D
	Stand	Stand (Included)	Stand (Included)
Accessories	Manuals	Quick Setup Guide, Warranty Card, Application CD	Quick Setup Guide, Warranty Card, Application CD
	Cables	D-Sub, Power Cord, Speaker Wire	D-Sub, Power Cord, Speaker Wire
	Others	Remote Controller, BNC to RCA Jack, Batteries, Stand Hole Cover, Stand (Included)	Remote Controller, BNC to RCA Jack, Batteries, Stand Hole Cover, Stand (Included)

SAMSUNG

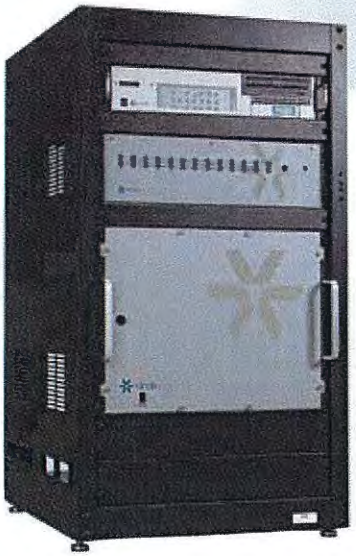
Product Information: 1-866-542-7214 www.samsungforbusiness.com
Product Support: 1-800-SAMSUNG

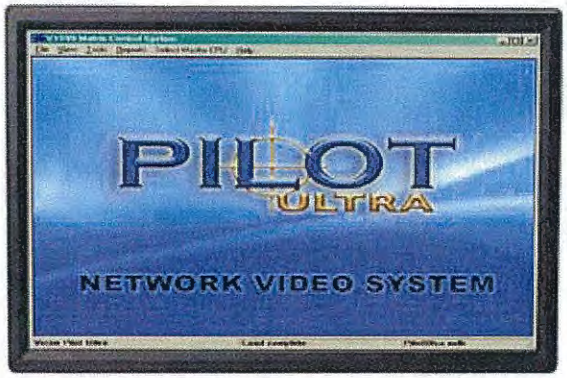
CHANGE FOR THE BETTER WITH ENERGY STAR

©2008 Samsung Electronics America, Inc. Samsung is a registered mark of Samsung Electronics Corp., Ltd.
Specifications and design are subject to change without notice. See www.samsung.com for detailed information.
Printed in USA. LFD-400UXn-460UXnDSHT-May08T

Video Switch

Pilot Ultra V1599
Network Video Switching Control System





Supports Large-Scale Matrix Systems up to 8192 Cameras and 512 Monitors

- Modular configuration enables simple system expansion at any time
- Supports up to 512 keypads, 8192 PTZ or fixed cameras, 8192 alarm inputs and 512 monitors
- Network connectivity through Communication Distribution Unit (CDU) to existing Vicon® products
- Microsoft® Windows® based Configurator simplifies system programming

The Pilot Ultra™ V1599 Network Video Switching Control System was developed to satisfy the needs of large-scale and distributed matrix system users. The Pilot Ultra System incorporates LAN communication in a standard, open-architecture design that lends itself to simple expansion. This open-architecture design permits the easy addition of keypads, receivers, alarm devices, video switching units, and host RS-232 controllers.

The Pilot Ultra System is comprised of three main items: the Pilot V1599 Central Processing Unit (CPU) that stores all system configuration information, the Pilot V1599 CDU that can be configured in multiple ways to act as a gateway from the network environment to conventional non-network products and the Pilot 66/99 Card Cage, which connects the cameras and monitors to the system.

The Pilot V1599 can be configured with hot standby capability. This capability will allow redundant components to take over in the event of a primary system failure.

A Windows-based Configurator provides an intuitive interface for programming and control of all system functions, such as:

- Network Configuration
- Timed or Triggered Event Programming
- Keypad Setup
- Receiver Profile Configuration
- Camera Setup
- Titling and Identification of Cameras, Monitors and Presets
- Monitor Setup
- Salvo Configuration
- Tour Configuration
- Alarm Processing Configuration

VICON

Corporate Headquarters
89 Arkay Drive
Hauppauge, New York 11788
631-952-CCTV (2288)
800-645-9116
Fax: 631-951-CCTV (2288)

Vicon Europe Headquarters
Brunel Way
Fareham, PO15 5TX
United Kingdom
+44 (0) 1489 566300
Fax: +44 (0) 1489 566322

Germany
vin-videotronic infosystems gmbh
Lahnstrasse1
D-24539 Neumuenster
Phone: +49 (0) 4321 8790
Fax: +49 (0) 4321 879 97

Far East Office
Unit 5, 17/F, Metropole Square
2 On Yiu Street, Shatin
New Territories
Hong Kong
(852) 2145-7118
Fax: (852) 2145-7117

www.vicon-cctv.com

PILOT ULTRA

Technical Specifications

OPERATIONAL

Compatibility: Compatible with all generations ofV1500, V1400 and V1300 matrix system components, Pilot, NOVA and Surveyor product lines.

Maximum Component Configurations:
Video Inputs: 8192.
Monitor Outputs: 512.
Receiver/Dome Support: 8192.
XIA Alarm Inputs: 8192.
Keypad/Console/Host RS-232 Support: 512.
Time/Date/Titler Outputs: 512.
Video Tour Patterns: 256.
Salvo Switch Configurations: 128.

ELECTRICAL

V1599CPU

Input Voltage: Selectable 120/230 VAC, 50/60 Hz.
Current: 6A nominal.
Power Consumption: 300 W nominal
CPU: Intel® Celeron 3.06 GHz.
RAM Memory: 512 MB.
Hard Drive: 80 GB.
Operating System: Windows XP Embedded.

V1599CDU

Input Voltage: Universal 85-265 VAC, 47-60 Hz.
Current: 300 mA nominal.
Power Consumption: 36 W nominal.
Rear Panel Controls/Indicators:
Network: Two RJ-45 connectors.
Video: Two 25-pin D-shell connectors and one BNC-F connector.
Alarm: Two 37-pin D-shell connectors.
Serial: Two RJ-45 connectors.
TDT: Two DB-25.

Pilot 66/99 Card Cage

Input Voltage: 120-230 VAC, 50/60 Hz Auto range.
Current: 0.5 A RMS max. Fully loaded card cage.
Power Consumption: 60 W max. Fully loaded card cage.

MECHANICAL

Application: Indoor.
Mounting: All units may be rack mounted in a standard EIA compliant rack,

V1599CPU

Dimensions: Width (W): 19.0 in. (483 mm).
Depth (D): 17.7 in. (450 mm).
Height (H): 3.5 in. (89 mm).
Weight: 21.8 lb (9.8 kg).
Color: Front Panel: Gray; Case: Matte black finish.

V1599CDU

Dimensions: Width (W): 19.0 in. (483 mm).
Height (H): 5.25 in. (133 mm).
Depth (D): 14.0 in. (355.5 mm) with external hardware.
Weight: 21.2 lb (9.6 kg) standard configuration.
Color: Gray.

Pilot 66/99 Card Cage

Dimensions: Height (H): 14.0 in. (356 mm).
Width (W): 19.0 in. (483 mm).
Depth (D): 8.5 in. (216 mm).
Weight: Approximately 27 lb (12.27 kg).
Color: Front panel: Gray.

ENVIRONMENTAL

V1599CPU and V1599CDU

Operating Temperature Range: 32 to 113° F (0 to 45° C).
Operating Humidity Range: 10 to 90%, noncondensing.

Pilot 66/99 Card Cage

Operating Temperature Range: 32 to 122ºF (0 to 50ºC).
Operating Humidity Range: Up to 95% relative, non-condensing.

Product Codes, Model Numbers and Descriptions for Main Components of Pilot Ultra

V1599CPU	9318-00	Pilot V1599 Central Processing Unit. Includes internal graphic configurator, capable of addressing over 8000 cameras and 500 monitor and keypad stations. Use with companion Pilot-CDU Communication Distribution Unit and Matrix Switching System
V1599CDU-1	9319-00	Pilot V1599 Communication Distribution Unit. Configured to address 2046 cameras, 128 monitors, 512 receivers, 16 keypads, one RS-232 port and monitor titling. Includes one network interface card and one power supply module.
V1580SCC	6020-80	Pilot66/99 card cage (256x16 or 256x32). Accepts up to 8 switcher boards. Includes motherboard, line sync board and universal power supply.

Refer to the Product Price List for Product Codes of other components and Prepacs.

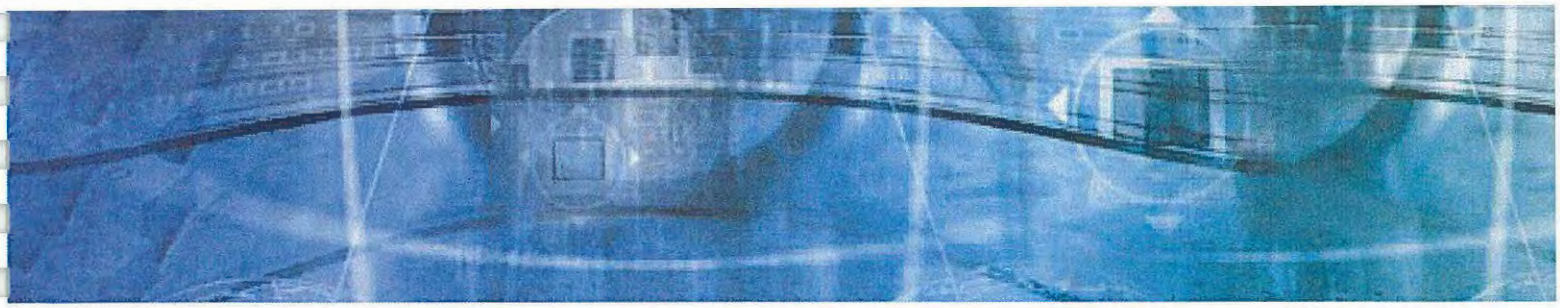
Vicon, its logo and ViconNet are registered trademarks of Vicon Industries Inc. Pilot Ultra is a trademark of Vicon Industries Inc.
Microsoft and Windows are registered trademarks of Microsoft Corporation.

Copyright© 2008 Vicon Industries Inc. All rights reserved.

Vicon part number 8015-5119-00-00

Product specification subject to change without notice.

Web Server Blade



AXIS Rack Solution

More video servers in less space – quick, flexible and professional installation and service

The AXIS Video Server Rack is a 19" rack solution that can be used to mount a large number of video servers (typically serving 15-20 cameras and upwards) with a common power supply, providing a space-efficient solution.

The Axis rack solution combines high reliability and functionality with quick, flexible and professional installation. Designed for improved serviceability and quick replacement of units, the rack holds up to 12 interchangeable and hot-swappable blades, so there is no need for power-down during installation or service.

The Axis rack solution is designed for applications involving large number of cameras, both existing and new systems. It is also ideal for applications handling large physical surveillance areas such as prisons, airports, large buildings, university campuses and bus, subway and railway stations.

- Quick and professional installation of various video servers in the same rack
- Expandable system, simply by adding blades and wiring up
- Integrated power supply, for easy installation/expansion, and easy addition of back-up power solutions
- Higher density of video channels compared to stand alone solution
- Improved serviceability and trouble-free unit replacement

AXIS COMMUNICATIONS
Make your network smarter

AXIS Video Server Rack

Hardware & System
- Aluminum rack, 19" / 3U
- Available slots: 12 (support hot swap)

Connections
- Video: Analog video input/s (BNC)[1]
- Power: 100-240 VAC, 50/60 Hz, 1.6 A

Each slot contains the following connectors on the rear of the rack:
- Network: 10Base-T/100Base-TX Ethernet networks (RJ-45)
- Serial communication: RS-232 & RS-485 (terminal block)
- I/O: alarm inputs and outputs (terminal block)[2]

Operating Conditions
- Temp: 5 - 50 °C (41-122 °F)[3]
- Humidity: 20 - 80% RHG

Dimensions and Weight
- Height: 132 mm (5.2")
- Width: 482 mm (19.0")
- Depth: 300 mm (11.8")
- Weight: 3.3 kg (7.3 pounds)(incl. PSU)

Shipping contains
- Video server rack
- Power supply module (installed)
- Blanking panels (installed)
- Connector kit
- Mains cable
- Installation guide

Approvals
- EMC:
  - CE compliant according to:
    - + EN55024:1998 +A1
    - + EN61000-6-1:2001
    - + EN61000-6-2:2001
    - + EN55022:1998 +A1 Class B
    - + EN61000-3-2:2000
    - + EN61000-3-3:1995 +A1
  - FCC Part 15 subpart B, demonstrated by compliance with EN55022:1998
  - VCCI:2002 Class B ITE
  - C-tick AS/NZS 3548
- Safety
  - EN60950

1. Video input(s) are located on the blade
2. Number of inputs and outputs varies between different types of Blade.
3. Ensure proper ventilation/cooling when installing multiple racks.

AXIS Blade Video Servers

The following Blade Video Servers are available. Further information will be found in the respective video server datasheet. Functionality of a blade server is exactly the same as the stand alone version of the video server.
Each blade is shipped with connector kit, installation guide for video server rack and the respective video server manual.

Product Selection Guide

Product	No. of channels	Video compression	Total Frame Rate (NTSC/PAL)	Video Motion Detection	Alarm inputs/outputs	PTZ support	HTTPS	Audio support
240Q Blade	4	Motion JPEG	24/20	Yes	4 / 4	Yes	Yes	No
241Q Blade	4	Motion JPEG/ MPEG-4	120/100	Yes	4 / 4	Yes	Yes	No
241S Blade	1	Motion JPEG/ MPEG-4	30/25	Yes	4 / 4	Yes	Yes	No
250S Blade	1	MPEG-2	30/25	No	4 / 1	Yes	No	Yes
2400+ Blade	4	Motion JPEG	30/25	No	4 / 1	Yes	No	Yes*
2401+ Blade	1	Motion JPEG	30/25	No	4 / 1	Yes	No	Yes*

* Requires the AXIS 2191 Audio Module

NOTE: Please see separate datasheets for all stand-alone video servers.

www.axis.com

©2005, Axis Communications AB. The Axis logo is a registered trademark of Axis Communications AB. All other company names and products are trademarks or registered trademarks of their respective companies. We reserve the right to introduce modifications without notice.

AXIS COMMUNICATIONS
Make your network smarter

24780/EN/R4/0505

Field Equipment

Traffic Cabinet

1. All cabinets should be wired for SOP 10 operations, but should be configured for the applied intersection.
2. Fiber optic cable must be single mode Corning ALTOS Dry Dielectric
3. Controller shall be Siemens m50 Series Traffic Controller and compatible with Bay County ATMS system.
4. Cabinet shall have a 16 channel EDI MMU and be Ethernet ready.
5. The cabinet shall be fitted with an external compartment for automatic switching for an emergency generator.

Pad Mounted Cabinet

Siemens Size P Cabinet Assembly for NEMA Specification

Description

The Siemens Size P cabinet protects electronic components including controllers and other instruments. It also features an aluminum enclosure for protection from all forms of outdoor natural elements, including rain, sleet, and snow, as well as seepage and splash.

Features / Options

- Outward rotating door handle.
- Double-flanged door frame to provide a better splash shield.
- Continuously welded enclosure for maximum protection from contaminants.
- Unique lock keying combinations.
- Custom painting per customer requirements.
- Special fan mounting and air filters available.
- Lifting ears

Cabinets by Siemens

Door Specifications

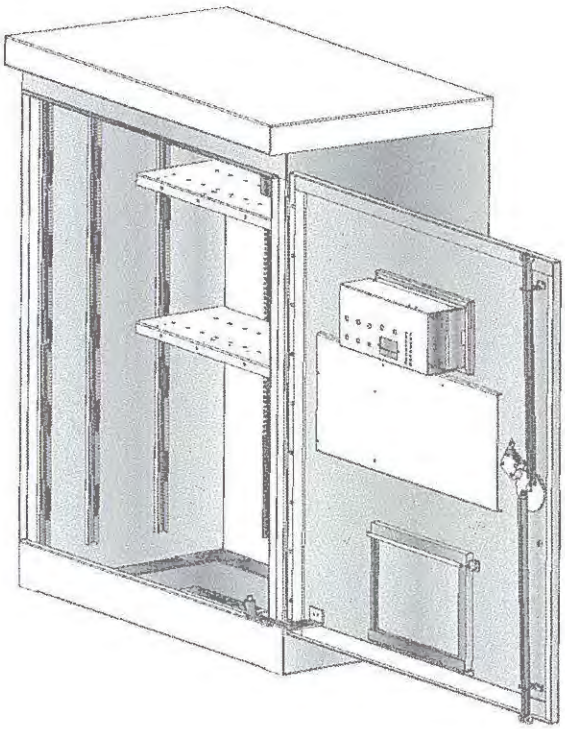
- Provided with three-point locking mechanism with nylon rollers.
- ¾"-diameter stainless steel outward turning handle with provisions for padlocking.
- Main Door lock - industrial standard pin tumbler lock with #2 key.
- Louvered inlet with filter to prevent dirt from entering with air flow.
- Closed-cell neoprene door seal gasket used.
- Heavy gauge stainless steel continuous hinge utilizing a1/4"-diameter stainless steel hinge pin for door support, carriage bolted in place, for ease of door removal.
- A 2"-deep, fabricated switch compartment isincluded with a standard "police" lock and a18-gauge stainless steel continuous hinge with a 1/8"-diameter hinge pin riveted in place. Compartment is mounted flush to the door.

Dimensions and Enclosure

- Completely fabricated from .125"-thick type 5052-H32. Vinyl-coated, mill-finished aluminum utilizing intermittently welded construction, subsequently weatherproofed with silicone sealant.
- Internal attaching components include six (6) adjustable "C" mounting channels (3 per side), and three (3) slotted rails on rear wall for attaching equipment panels.
- The door opening is single-flanged on top to prevent water drops when the door is open. The opening also includes a mount for two door-operated switches.
- Thermoconvection air ventilation system utilized with provisions for mounting fan for forced-air cooling. Exhaust outlet openings are provided under the roof over-hang.
- All internal and external hardware utilizes non-corrosive material.
- Adjustable 3/8"-diameter stainless steel door stop can be latched in various positions.
- Two (2) sheleves included.

Ordering Information

- EL712 - Base Mount



All of Siemens cabinets and accessories are built with the highest standards in quality and manufacturing. With a long standing history of technological innovations, well renowned customer service, and high quality products and services, Siemens is the leader in traffic technology products and solutions. For more information on our product line see our website at www.itssiemens.com.

For more advanced future features and/or more information on Siemens software products call +1.512.837.8310 or contact your local distributor (see website for the dealer in your area). Siemens reserves the right to alter any of the Company's products or published technical data relating thereto at any time without notice.

© Siemens 2009. All Rights Reserved
Traffic Solutions
8004 Cameron Road, Austin, TX 78754
Tel. +1.512.837.8310 • Fax +1.512.837.0196

www.itssiemens.com

BAY COUNTY TS2-2 CABINET SPECIFICATIONS

1.0 CABINET DESIGN AND CONSTRUCTION

1.1 GENERAL

1.1.1 The cabinet and door(s) shall be constructed from type 5052-H32 aluminum with a minimum thickness of 0.125 inches. All welds shall be neatly formed and free of cracks, blowholes and other irregularities.

1.1.2 All inside and outside edges of the cabinet shall be free of burrs. All sharp edges shall be made smooth.

1.1.3 The cabinet shall be designed and manufactured with materials that will allow for base mounting.

1.1.4 A rain channel shall be incorporated on the main door opening to prevent liquids from entering the enclosure. Cabinet door openings shall be double flanged outward to produce the rain channel.

1.1.5 The top of the cabinet shall incorporate a minimum one (1) inch slope toward the rear to prevent rain accumulation.

1.1.6 The cabinet shall be supplied with a natural aluminum finish. Sufficient care shall be taken in handling to ensure that scratches are minimized. All surfaces shall be cleaned of all oil residue and shall be free from weld flash.

1.1.7 All interior seams shall be sealed with RTV sealant or equivalent material.

1.1.8 All cabinets shall be supplied with two removable shelves manufactured from 5052-H32 aluminum having a minimum thickness of 0.125 inches. Shelves shall have a minimum depth of ten and one-half (10.5) inches.

1.1.9 Three (3) vertical "C" channels shall be mounted on each interior side wall of the cabinet for the purpose of mounting the cabinet components. The channels shall accommodate spring-mounted nuts or studs. All mounting rails shall extend to within four (4) inches of the top and bottom of the cabinets. Rivets or pop-rivets of any kind shall not be used in the cabinet or on the main panel. No bolts or screws shall protrude through the outside walls, top, bottom, or sides of the cabinet.

1.1.10 All cabinets shall be supplied with four (4) anchor bolts to properly secure the cabinet to its base.

1.2 DOOR and HARDWARE

1.2.1 The lower section of the cabinet door shall be equipped with a louvered air entrance. The air inlet shall be large enough to allow sufficient airflow per the rated fan capacity. A removable fiberglass air filter shall be supplied with each

cabinet. The filter shall be secured to the air entrance in such fashion as to maintain close contact at all times to the louvered air entrance.

1.2.2 The roof of the cabinet shall incorporate an exhaust plenum with a vent screen. Perforations in the vent screen shall not exceed 0.125 inches in diameter.

1.2.3 The main door shall be equipped with a three-point draw roller type latching mechanism. The push rods shall be turned edgewise at the outward supports and shall be 0.250 inch by 0.750 inch aluminum, minimum.

1.2.4 The handle on the main door shall include a hasp for the attachment of an optional padlock. The handle shall not extend beyond the perimeter of the main door at any time. The lock assembly shall be positioned so that the handle shall not cause any interference with the key when opening the cabinet door. When the door is closed and latched, the door shall automatically lock. It shall not be necessary to use a key in order to lock the door.

1.2.5 The main door shall be equipped with a mechanism to automatically hold the door open at approximately ninety (90), one hundred twenty-five (125), and one hundred fifty (150) degrees, in windy conditions.

1.2.6 The main door shall be equipped with a #2 tumbler lock. The lock shall be of brass construction, and shall have a swing away cover. Two (2) No. 2 keys shall be supplied and attached to each cabinet door upon shipment.

1.2.7 The cabinet shall have a full rear door to allow access to the back of the load bay.

1.2.8 The rear of the load bay shall be covered by a sheet of Plexiglass to minimize exposure to the elements when the rear door is open.

1.3 POLICE SWITCH COMPARTMENT

1.3.1 A switch compartment shall be provided on the main door.

1.3.2 The opening for the switch compartment door shall be double flanged on all four (4) sides and shall incorporate a rain channel on all four (4) sides.

1.3.3 The police door lock shall be of brass construction, and shall have a swing away cover. All cabinets shall have a police panel door that utilizes a slam shut type latching mechanism. Two (2) police keys shall be supplied and attached to each cabinet door upon shipment.

2.0 TYPE 1 TERMINALS AND FACILITIES MAIN PANEL DESIGN

2.1 The main panel shall be constructed from 5052-H32 brushed aluminum of 0.090 inches minimum thickness and formed so as to minimize any flexing when plug-in components are installed.

2.2 All main panels shall be hinged at the bottom to allow easy access to all wiring on the rear of the panel. The cabinet back panel conductors shall be arranged to allow the top of the panel to be tilted out through the main cabinet door.

2.3 The main panels shall be fully wired in the following configurations:

Sixteen (16) load switch sockets, (eight (8) vehicle sockets, four (4) pedestrian sockets and four (4) overlap sockets) eight (8) flash transfer relay sockets, one (1) flasher socket and two (2) main panel BIU rack positions.

2.4 Reference designators for all load switch and flash transfer relay sockets shall be silk-screen labeled on the front and rear of the main panel.

Up to eight (8) load switch sockets may be positioned horizontally or stacked in two (2) rows on the main panel. If more than eight (8) load switch sockets are required they shall be mounted in two (2) horizontal rows.

2.5 A bracket extending at least half the length of the load switch shall support all load switches. This support must be rigidly mounted to the main panel and be removable for maintenance by using hand tools only.

2.6 All field output circuits shall be terminated on a non-fused terminal block with a minimum rating of twenty (20) amps.

2.7 All main panels shall provide means of programming the controller phase outputs to load switch inputs with only the use of a screwdriver.

2.8 Permanent alphanumerical labels shall identify all field input/output (I/O) terminals. All labels shall use standard nomenclature per the NEMA TS 2 Specification.

2.9 All flash color selection shall be accomplished at the field terminals with the use of a screwdriver only. It shall also be possible to select through terminal connections, which of the two (2) flasher circuits is connected to each phase. All cabinet flasher circuit and flash color wiring shall be wired as below or as specified on the plans.

Flasher circuit output #1 shall be wired for phases 1, 2, 5, 6 and overlap A and overlap C. Flasher output circuit #2 shall be wired for phases 3, 4, 7, 8 and overlap B and overlap D. All cabinets shall be pre-wired to flash phases 2 and 6 and overlaps A and C yellow and all other phases and overlaps red.

2.10 Signal output terminals shall be screw type; Compression type termination shall not be acceptable.

2.11 As a minimum, an RC network shall be wired in parallel with each group of three (3) flash-transfer relay coils. An RC network shall be installed on all other relay coils.

2.12 All Controller Unit and Malfunction Management Unit cables shall be of sufficient length to allow the units to be placed on either shelf. Connecting cables shall be

jacketed or sleeved in a braided nylon mesh. The use of exposed tie-wraps or interwoven cables is unacceptable.

2.13 All cabinet configurations shall be provided with enough RS-485 Port 1 communication cables to allow full capabilities of the cabinet. Each communication cable connector shall be a 15-pin metal shell D sub-miniature type. The cable shall be a shielded cable suitable for RS-485 communications.

2.14 All main panels shall be pre-wired for a Type-16 Malfunction Management Unit.

2.15 All wiring shall be neat in appearance. All cabinet wiring shall be continuous from its point of origin to its termination point. Butt type connections/splices are not acceptable. All cabinet back panel conductors shall be soldered, at its destination point as specified. Printed circuit boards, except for detector rack, loop detector panel and pedestrian isolation boards, shall not be used on main panels.

2.16 All connecting cables and wire runs shall be secured by mechanical clamps. Stick-on type clamps are not acceptable.

3.0 POWER PANEL DESIGN AND CONSTRUCTION

3.1 The power panel shall consist of a separate, fully enclosed module, securely fastened to the lower right side wall of the cabinet. The power panel shall be wired to provide the necessary power to the cabinet, controller, Malfunction Management Unit, cabinet power supply and auxiliary equipment. All components of the power panel shall be accessible for ease of replacement without removing any other components or equipment. Adequate space between components shall be provided for the tightening of all terminals.

3.2 The power panel shall be identical for all cabinets except for breaker sizing. The power panel shall house the following components:

The main circuit breaker shall be single pole Square-D or approved equivalent and be rated for a minimum of 30 amperes or more depending on load requirements of each intersection. This breaker shall supply power to the controller, MMU, signals, cabinet power supply, and separate breakers used to split the power feed and auxiliary panels. All breakers shall be installed in a vertical orientation.

One (1) single pole fifteen amp (15-amp) breaker labeled "Auxiliary" shall supply power to the fans, lights and GFCI outlet. The power feed for this breaker shall not be fed from the load side of the main breaker but will be fed from the main line feed side.

A 50 amp, 125 VAC radio interference line filter shall be supplied.

A normally open, 60-amp, mercury contactor shall be supplied.

One (1) insulated AC neutral bus bar with a minimum of twelve (12) positions capable of accepting three #12 wires per position.

One (1) earth ground bus bar (chassis ground) with a minimum of seven (7) positions large enough to accept three #12 wires per position.

A lightning suppressor, EDCO ACP-340 or equivalent shall be provided.

4.0 AUXILIARY CABINET EQUIPMENT

4.1 The cabinet shall be provided with a thermostatically controlled ventilation fan (adjustable between 80-150 degrees Fahrenheit) in the top of the cabinet plenum.

4.2 A fluorescent lighting fixture shall be mounted on the inside top of the cabinet near the front edge. The lamp shall be wired to a door-activated switch mounted near the top of the door. If the main door is closed the lamp will be off.

4.3 A rigid slide-out document tray shall be mounted below the bottom shelf. The tray shall be of sufficient size and strength to hold a complete set of cabinet wiring drawings, intersection diagrams, equipment and programming manuals for all equipment and modules applicable to each cabinet. The tray shall operate by sliding out, then opening a hinged cover to remove documents. After removing the documents and closing the cover, the tray shall serve as a suitable resting place for documents or a laptop computer

4.4 Three (3) sets of complete and accurate cabinet wiring drawings shall be supplied with each cabinet.

4.5.1 One (1) hard copy set of manuals for the Controller Unit, Malfunction Management Unit, Power Supply, Detector Rack, Vehicle Detector Amplifier modules shall be supplied with each cabinet.

5. 0 VEHICLE DETECTION

5.1 A vehicle detector amplifier rack shall be provided in each cabinet. The detector rack shall support a minimum of ten (10) two (2)-channels loop detectors, and one (1) BIU, or additional rack positions to accommodate detection requirements as specified in the plans.

5.2 Each cabinet shall contain detector interface panels for the purpose of connecting field loops and vehicle detector amplifiers.

5.3 One (1) sixteen (16) position interface panel shall be provided for each twenty (20) channel detector rack supplied, or additional panels may be provided to connect all loop detectors required by the plans. The interface panel(s) shall be attached to the lower left side wall of the cabinet.

5.4 Each interface panel shall allow for the connection of a minimum of sixteen (16) independent field loops. A ground bus terminal shall be provided between each loop pair terminal to provide a termination for the loop lead-in ground wire. Detector terminals shall be screw type. Compression type termination shall not be acceptable.

5.5 All interface panels shall be provided with lightning protective devices for all channels. All interface panels shall be provided with EDCO SRA-6LC or approved equal lightning protective devices for all available inputs. Pedestrian inputs, if available on the loop detector panel, will be provided with PC642C-030 lightning suppression.

5.6 All termination points shall be identified by a unique number which is silk-screened on the panel.

5.7 Each detector rack shall be powered by the cabinet power supply.

6.0 CABINET AUXILIARY SWITCH PANEL AND POLICE PANEL

6.1 An auxiliary switch panel shall be mounted on the inside of the main door. The auxiliary switch panel shall provide as a minimum the following:

AUTO/FLASH SWITCH. When in the FLASH position, power shall be maintained to the controller and the intersection shall be placed in flash. The controller shall not be stop timed when in flash. When the switch is moved from FLASH position to the AUTO position, an external start signal shall be applied to the controller. This external start signal will force the controller to initiate the start up sequence when exiting flash.

STOP TIME ON/OFF SWITCH. When switch is in STOP TIME ON position, when applied, the controller shall be stop timed in the current interval.

STOP TIME OVERRIDE SWITCH. For additional safety, a stop time override momentary switch shall be provided to work in conjunction with the main stop time switch. The momentary stop time override switch prevents the stop time switch from being left in the stop time state.

EQUIPMENT POWER ON/OFF SWITCH. This switch shall control the Controller Unit, Malfunction Management Unit and Power Supply AC power. When in the ON position the AC power shall be applied.

POWER ON/OFF SWITCH. This switch shall totally remove power from the cabinet including the load bay and flasher.

SIGNALS ON/OFF SWITCH. When in the SIGNALS OFF position, power shall be removed from all signal heads in the intersection. The MMU shall not conflict or require reset.

VEHICLE DETECTOR TEST 1-8. There shall be a three (3) position TEST-OFF-NORMAL toggle switch located in the auxiliary panel for vehicle phases one (1) through eight (8). In the TEST position, a call will be placed on the respective phase as long as the switch is held in the TEST position. The toggle switch will be constructed such that the TEST position is spring-loaded and must be manually held in this position. In the OFF position, the vehicle detector will not place a call on the respective vehicle phase. In the NORMAL position, the vehicle detector for that phase will be enabled to place calls on the respective vehicle phase when vehicles are detected.

PEDESTRIAN DETECTOR TEST. There shall be a push button type test switch located in the auxiliary panel for pedestrian phases 2, 4, 6 and 8, or as required on the plans. The push buttons shall be used to place calls on their respective pedestrian phases when active.

6.2 The police door switch panel shall contain the following:

AUTO/FLASH SWITCH. When in the FLASH position, power shall be maintained to the controller and stop time shall be applied. The intersection shall be placed in flash. When the switch is moved from FLASH position to the AUTO position, an external start signal shall be applied to the controller. This will force the controller to initiate the start up sequence when exiting flash.

AUTO/MANUAL SWITCH. Cabinet wiring shall include provisions for an AUTO/MANUAL toggle switch, terminal and a six (6) foot hand cord (to be included).

6.3 All toggle type switches, except those used for detector test purposes, shall be heavy duty and rated for fifteen 15 amps, at a minimum. Single or double-pole switches may be provided, as required.

6.4 All switch functions shall be permanently and clearly labeled.

6.5 All wire routed to the police panel and auxiliary panel shall be adequately protected against damage from repetitive opening and closing of the main door.

7.0 AUXILIARY DEVICES

7.1 Load Switches

7.1.1 Signal load switches shall have a minimum load current rating of 10 amperes at 120 VAC for incandescent lamp load.

7.1.2 The front of the load switch shall embody a minimum of three (3) LED indicators.

7.1.3 The minimum amount of load switches shall be supplied with each cabinet to allow for maximum phase utilization except for the overlaps.

7.2 Flashers

7.2.1 The flasher shall be rated at fifteen (15) amperes, double pole with a nominal flash rate of sixty (60) FPM.

7.3 Flash Transfer Relays

7.3.1 All flash transfer relay contacts shall be capable of making, breaking, with a contact current rating of twenty (20) amperes.

7.3.2 The coil of the flash transfer relay must be de-energized for flash operation.

7.3.3 The full complement of flash transfer relays shall be supplied with each cabinet to allow for maximum phase utilization for which the cabinet is designed. A minimum of six (6) flash transfer relays shall be provided with each controller assembly.

7.4 Bus Interface Units

7.4.1 All Bus Interface Units (BIU's) shall meet the requirements of the NEMA TS 2-1998 Standard.

7.4.2 The full complement of (BIU's) shall be supplied with each cabinet to allow for maximum phase and function utilization for which the controller cabinet is designed.

7.4.3 Each (BIU) shall include power on, transmit and valid data indicators. All indicators shall be LED's.

7.5 Vehicle Detection System

7.5.1 All detector racks shall contain the appropriate number of two (2) channel detector amplifiers to fulfill the detection requirements shown on the intersection plans.

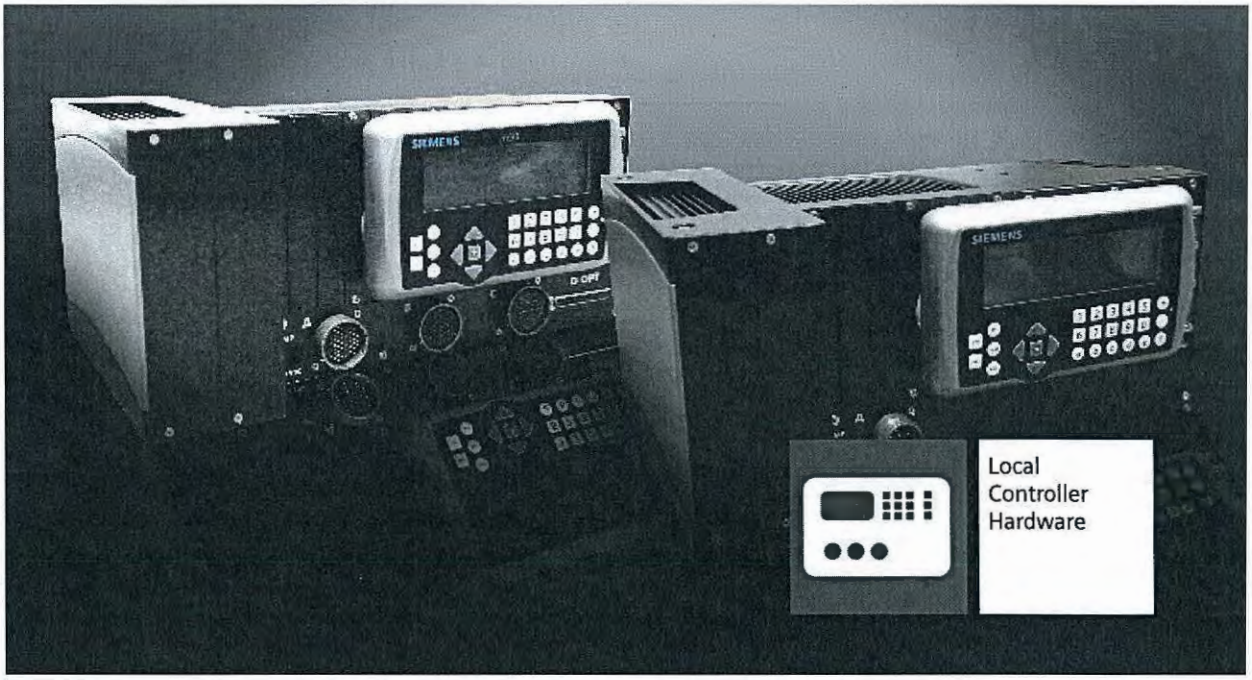
7.6 24 Volt Power Supply

7.6.1 The TS 2 cabinet power supply shall provide regulated DC power, unregulated AC power and a line frequency reference for the TS 2-detector rack, (BIU's), load switches, and other auxiliary equipment. As a minimum, the power supply shall meet all applicable requirements of the NEMA TS2 Traffic Controller Assemblies with NTCIP Requirements, 1998.

7.7 EMERGENCY Preemption Panel – Fully functional for preempt operation(s).

7.7.1 A preemption test panel shall be mounted on the left cabinet wall. The panel will include four (4) pushbutton type test switches connected to the controller preempt inputs. This panel shall include interface(s) as necessary to implement the tested preempt(s).

Controller



Siemens m50 Series Traffic Controller

Siemens controller line for use in NEMA style cabinets

Description

The Siemens m50 series controllers are an innovative, fully actuted controller unit with an extensive compliment of operational, programming, and diagnostic capabilities. The m50 series exceeds many industry standards and specifications with advanced functionality beyond the normal NEMA standards. The m50 features new capabilities and enhancements in hardware design and communications. The series consists of the m51 TS2 Type 1, m52 TS2 Type 1,2 and the m53 TS2 Type 2 models.

Benefits

- Multiple communication interface options
- Backward compatible to supports a variety of cabinet styles including the NEMA TS1, TS2 Type 1, and TS2 Type 2
- Eliminates need for EPROM chip replacement
- Ability to reduce costs by using single front panel for multiple controllers
- Simple and proven closed-loop solution

Features

- Built in external 10 Base-T Ethernet port with configurable IP
- 8MB of flash memory
- NEMA TS2 Type 1 15-pin Input/Output serial connection to the bus interface unit
- NEMA TS2 Type 2 for direct parallel connection to load switches and detectors
- Removable hand held front panel with 8x40 character backlit LCD display

Making motion manageable

www.itssiemens.com

SIEMENS

Controllers by Siemens

Central Processor Unit (CPU)

- Open architecture platform with standard OS9™ operating system
- Motorola 68360 32 bit, 25MHz processor with CPA32 instruction set
- TOD Clock with automatic daylight savings time adjustment
- Power supply will power the SRAM during power failures

Keyboard and Display

- Removable light-emitting diode backlit LCD Display with 8 lines of 40 characters with adjustable contrast setting.
- Emulation of terminal per Joint NEMA/ AASHTO/ITE Standard.
- Key quantity and function per Joint NEMA/ AASHTO/ITE Standard.

Communications

- 10 Base-T Ethernet with front panel RJ-45 connector
- Unique MAC address assigned by the Institute of Electrical and Electronic Engineers (IEEE)
- EIA-232 port for uploading/downloading applications software and OS updating
- Single and multi-mode fiber optic options
- 1200 bps Frequency Shift Keying (FSK) modem (optional)

Controller Housing

- Seven (7) expansion slots with card guides for standard size Versa Modules and two (2) slots with card guides for standard Joint NEMA/AASHTO.ITE ATC modems (optional)
- Polycarbonate construction (excluding back panel), rear mounting tabs and aluminum power supply mounting plate for electrical grounding
- Carrying Handle

All of Siemens controllers and accessories are built with the highest standards in quality and manufacturing. With a long standing history of technological innovations, well renowned customer service, and high quality products and services, Siemens is the leader in traffic technology products and solutions. For more information on our product line see our website at www.itssiemens.com.

© Siemens 2010. All Rights Reserved.
Traffic Solutions
8004 Cameron Road, Austin, TX 78754
Tel. +1.877.420.2070 • Fax +1.512.837.0196

For more advanced future features and/or more information on Siemens software products call +1.877.420.2070. Siemens reserves the right to alter any of the Company's products or published technical data relating thereto at any time without notice.

All trademarks used are property of Siemens or their respective owners.

Hardware Design

The M50 series controller is designed for efficient operation and ease of maintenance. The chassis is of injection molded, high impact polycarbonate and is designed for easy access to the boards for testing without disassembly. A molded handle makes the lightweight controller easy to carry. The controller is convection cooled with vent slots in the back and openings along the bottom. Adjustable rubber feet along the front allow users to change the angle of the display and create more or less space around the controller. Grounding metal feet in the rear stabilize the controller.

SE-PAC Local Controller Software

SE-PAC local software incorporates 20 years of actual "on street" traffic monitoring and controlling experience. There over twenty thousand (20,000) local controllers running SE-PAC local controller software throughout North America. Every state in the United States has a version of Siemens ITS local controller software installed.

The software is user-friendly, and it accommodates a variety of traffic control requirements through its diverse programming configuration capabilities. The software provides the functional requirements for multi-ring traffic controller assemblies as described in NEMA Standards Publications No. TS2-1998 Traffic Controller Assemblies, and provides all coordination modes required therein. The software operates in a distributed mode that makes use of the intelligence in the local controller. The SE-PAC software supports open architecture.

Advantages in Programming

- English Language Menus and user-friendliness;
- Each parameter can be viewed within a menu and a cursor moved to that parameter for changes;
- Easy verification with related parameters visible simultaneously;
- Programming area identification and editing prompts on the screen;

Traffic Capability Enhancements

- Adaptive Traffic Control;
- Multiple Coordination Modes;
- Preemption/Priority Routines;
- Numerous Standard Reports;
- Built-In Diagnostics;
- Time Base Control.

Adaptive Traffic Control Features

Offers simple or highly complex control via:

- 16 Vehicle Phases;
- 16 Pedestrian Phases;

- 4 Timing Rings;
- 16 Overlaps;
- 80 Detectors;
- Adaptive Maximum Routines;
- Adaptive Protected/Permissive Routines;
- Coordination Virtual Split Routine;
- Coordination Adaptive Split Routines.

Texas Diamond Intersection Control

- Four Phase Diamond mode;
- Basic Three Phase Diamond mode;
- NEMA mode;
- Separate Intersection mode.

Six Modes of Coordination

- Permissive Mode;
- Yield Mode;
- Permissive Yield Mode;
- Permissive Omit Mode;
- Sequential Omit Mode;
- Full Actuated Mode.

Preemption/Priority Routines

- 6 Preempt Routines providing complete signal control;
- 6 Priority Routines providing complete phase control and in sync return to coordination.
- Preempt activity can be monitored on a Preempt Status display which denotes – Preempt In Control, Interval Timing, and Interval Countdown;
- Individual Preempt Status & Timing; Individual Priority Status & Timing.

Extensive Reports

- Local Alarm Log;
- Comm Fault Log;
- Detector Fault Log;
- System Detector Log;
- MOE Log; Speed Log;
- Volume Count Log;
- Cycle MOE Log.

Resident Diagnostic Program

Enhances the maintenance troubleshooting via:

- Cycling Diagnostics;
- Detector Diagnostics;
- Port 2 Comm Status Display;
- Port 3 Comm Status Display;

- Hardware I/O Status Display.

Time Base Control

- 250 events for the control of –
- Pattern Selection,
- Free,
- Flash,
- Dimming,
- Detector Diagnostic Parameters,
- System Detector Logging,
- 3 Auxiliary Functions,
- 8 Special Functions,
- 16 Traffic Functions;
- 99 Day Programs;
- 10 Week Programs.

NTCIP, ITS & National Architecture Compliance

SE-PAC complies with *NEMA TS 3.2 – Simple Transportation Management Framework*, and meets the requirements for Conformance Level 2.

SE-PAC complies with *NEMA TS 3.3 – Class B Profile*. The Class B objects have been implemented. All of the NEMA mandatory objects are supported, as well as many Siemens ITS custom objects.

NTCIP Conformance defines two conformance levels:

Conformance Level 1: SNMP version 1 - All supported objects including Internet standard objects are accessible. This level shall support the Internet system (group) objects

Conformance Level 2:

a) Conformance Level 1
b) STMP: All STMP operations
c) TMIB: A; mandatory objects & groups defined within the TMIB
d) Dynamic objects including: definition creation; definition deletion and object get and set data functions

The Florida Department of Transportation (http://rite.eng.fsu.edu) has completed an extensive NTCIP test on the EPAC controller, and it complied in all areas tested. They are currently in their second round of testing. In addition, SE-PAC has been submitted to the Georgia DOT and the Minnesota DOT for NTCIP testing.

SE-PAC software is compliant with Texas Regional Comprehensive ITS Program and the National Architecture.

Fiber Optic Patch Panel

Wall-Mountable Connector Housings (WCH)

A LANscape® Solutions Product

Applications

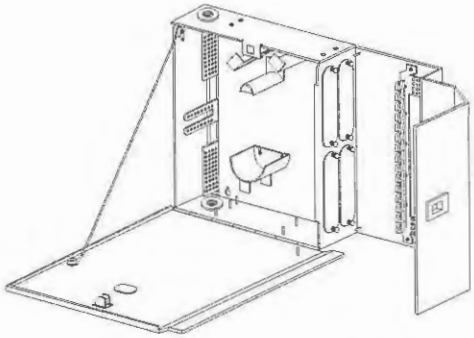
Corning Cable Systems Wall-Mountable Connector Housings provide interconnect or cross-connect capabilities between the outside plant, riser or distribution cables and the opto-electronics.

Description

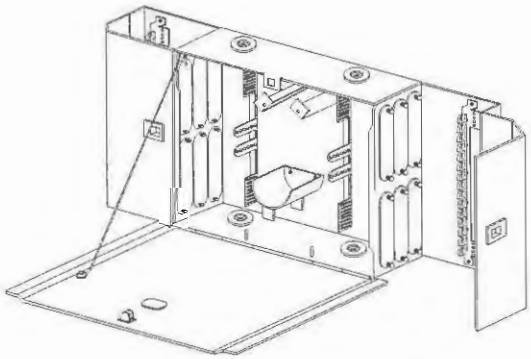
The units can be wall-mounted in main cross-connects (MCs) or telecommunication rooms (TRs), and are available in different versions: two panels, four panels, six panels and 12 panels.

Optional products such as the wall-mountable jumper storage guide kit (WJG-02R) and cable strain-relief kit (WCH-STRNRLF-KIT) have been designed to make your wall-mountable product installation easier. The standoff bracket (WCH-STDOFF-BKT) is designed to extend the WCH housing from the wall so that cable can be routed behind the units. Brackets can be stacked to allow a larger amount of space behind.

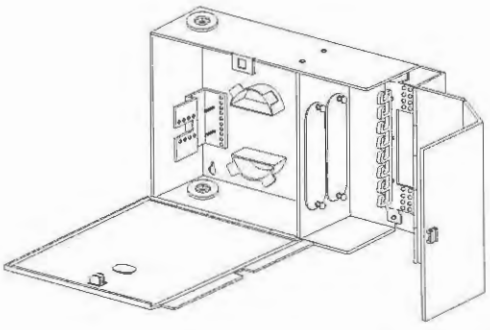
Wall-Mountable Connector Housings | Photo LAN703



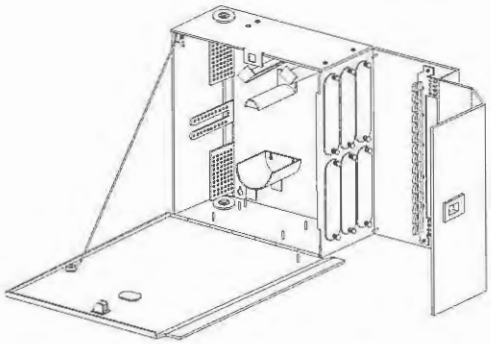
WCH-04P (up to 48 fibers) | Drawing CPC-220/5/34



WCH-12P (up to 144 fibers) | Drawing CPC-220/5/31



WCH-02P (up to 24 fibers) | Drawing CPC-220/5/35



WCH-06P (up to 72 fibers) | Drawing CPC-220/5/33

CORNING
Discovering Beyond Imagination

Wall-Mountable Connector Housings (WCH)

A LANscape® Solutions Product

Corning Cable Systems

Features / Benefits

- Optimized design for field connectorization
- Suitable for loose tube and tight-buffered fiber optic cables
- Metal cabinet construction
- Jumper routing guides and jumper strain-relief point
- Optional field-installable lock kit
- Includes bracket for buffer tube fan-out kits
- Optional splice tray holder allows easy cable routing and is designed to make field splicing easier; splice trays ordered separately
- Accepts standard CCH connector panels
- -04P, -06P and -12P housings have a durable, clear polycarbonate-tinted jumper door for easy viewing of jumper connections

Specifications

Part Number	Dimensions (Doors in Closed Position) (H x W x D) – cm (in)	Shipping Weight kg (lb)
WCH-12P	34.3 x 57.1 x 13.0 (13.5 x 22.5 x 5.125)	4.1 (9.0)
WCH-06P	34.3 x 40.8 x 13.0 (13.5 x 16.062 x 5.125)	3.3 (7.2)
WCH-04P	34.3 x 40.8 x 10.3 (13.5 x 16.062 x 4.062)	2.8 (6.2)
WCH-02P	23.5 x 33.2 x 8.2 (9.25 x 13.25 x 3.25)	2.5 (5.4)

Ordering Information

Part Number	Description
WCH-12P	Wall-Mountable Connector Housing that will accept up to 12 CCH panels; twelve 6-fiber panels = 72 fiber total capacity; twelve 8-fiber panels = 96 fiber total capacity; twelve 12-fiber panels = 144 fiber total capacity
WCH-06P	Wall-Mountable Connector Housing that will accept up to six CCH panels; six 6-fiber panels = 36 fiber total capacity; six 8-fiber panels = 48 fiber total capacity; six 12-fiber panels = 72 fiber total capacity
WCH-04P	Wall-Mountable Connector Housing that will accept up to four CCH panels; four 6-fiber panels = 24 fiber total capacity; four 8-fiber panels = 32 fiber total capacity; four 12-fiber panels = 48 fiber total capacity
WCH-02P	Wall-Mountable Connector Housing that will accept up to two CCH panels; two 6-fiber panels = 12 fiber total capacity; two 8-fiber panels = 16 fiber total capacity; two 12-fiber panels = 24 fiber total capacity

Ordering Information (continued)

Part Number	Description
Accessories	
WJG-02R	Wall-Mountable Jumper Storage Guides that provide jumper management; kit includes two routing guides and mounting screws
WCH-STDOFF-BKT	Wall-Mountable Connector Housing Wall Stand-off Brackets for -04P, -06P, -08P and -12P; brackets provide a 1-in spacing from wall
WCH-STDOFF-BKT-2P	Wall-Mountable Connector Housing Wall Stand-off Brackets for -02P; brackets provide a 1-in spacing from wall
BKT-ALL-R23-75	Universal Rack-Mount Bracket for 19-in or 23-in equipment racks; allows for rack-mounting of the wall-mountable units
WCH-STRNRLF-KIT	Optional External Cable Strain-Relief Kit that utilizes Corning Cable Systems' Universal Cable Clamp; includes bracket, mounting hardware, one strain-relief clamp and one multicable insert that will hold up to five cables less than 0.4 inches in diameter
WCH-DUST-CVR	Optional Dust Cover for -04P and -08P housing; covers jumper exits; includes two covers and mounting hardware
WCH-DUST-CVR-D	Optional Dust Cover for -06P and -12P housing; covers two jumper exits; includes two covers and mounting hardware; two kits required for -12P
WCH-LBL-KIT	Replacement Label Kit for WCH
HDWR-LOCK-KIT	Lock Kit for front door of housing; contains one lock with two keys
Optional Splice Tray Holders	
WCH-SPLC-12	Splice Tray Holder for WCH-12P; accommodates twelve 0.2-in-thick (Type 2R) or six 0.4-in-thick (Type 4R) reduced-length splice trays*
WCH-SPLC-4-8*	Splice Tray Holder for WCH-04P, WCH-06P and WCH-08P; accommodates eight 0.2-in-thick (Type 2R) or four 0.4-in-thick (Type 4R) reduced-length splice trays
WCH-SPLC-2P*	Splice Tray Holder for WCH-02P; accommodates two 0.2-in-thick (Type 2R) or one 0.4-in-thick (Type 4R) reduced-length splice trays
Slack Storage	
WCH-SSH-2*	Wall-Mountable Slack Storage Housing for WCH-02P; accommodates four 0.2-in-thick (Type 2R) or two 0.4-in-thick (Type 4R) reduced-length splice trays
WCH-SSH-4-12*	Wall-Mountable Slack Storage Housing for WCH-04P, WCH-06P, WCH-08P and WCH-12P; accommodates eight 0.2-in-thick (Type 2R and 2S) or four 0.4-in-thick (Type 4R and Type 4S) standard or reduced-length splice trays or four UST splice trays

**Splice trays ordered separately.*

Connector Panels

Must be ordered separately

UPS Power Supply

Novus FXM UPS Series

Outdoor UPS with 650, 1100, or 2000 W/VA Output

Novus FXM UPS

- Clean, uninterruptible backup power ensures your system will remain running during power outages
- Wide range Automatic Voltage Regulation without going to batteries lengthens battery life, even during periods of surge or sag in the line voltage
- External communications via RS-232 port or (optional) SNMP Ethernet interface provides local or remote monitoring and control
- Independently programmable and dry contact relays allow tracking and controlling of key functions
- Event and alarm logging with time and date stamping simplifies and accelerates troubleshooting
- A wide operating temperature range of -40 to 74°C (-40 to 165°F)[1] is suitable for the most extreme operating environments
- Control and power connection panels can be rotated for mounting and display in any orientation[2] for viewing convenience
- Temperature compensated battery charging protects batteries from over charging at extreme temperatures extending the life of the battery

The Novus FXM UPS Series provides constant, reliable backup power for Traffic, Security and Telecommunications applications. The Automatic Voltage Regulator (AVR) provides power stability in unpredictable environments and constant voltage during varied power conditions. The Novus FXM UPS Series instantly switches to emergency backup power during utility power failure or interruptions. Each power level is available in either North American (120 V) or International (230 V) variants, both with auto-frequency (60Hz/50Hz).

[1] Power module only. Output power derates after 55°C for FXM 650 and 1100, and after 50°C for FXM 2000.
[2] The LCD panel on the FXM 650 cannot be rotated.

Novus FXM UPS Power Modules

Nominal Specifications

Power Module:	FXM 650		FXM 1100		FXM 2000	
	North America	International	North America	International	North America	International
Nominal voltage:	120VAC	230VAC	120VAC	230VAC	120VAC	230VAC
Nominal frequency:	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz
Input current*:	8.7A	4.5A	15.5A	8.0A	20A	12A
Output current:	5.4A	2.8A	9.1A	4.78A	16.6A	8.69A
Output power at 50°c:	650W/VA	650W/VA	1100W/VA	1100W/VA	2000W/VA	2000W/VA
Output power at 74°c:	500W/VA	500W/VA	850W/VA	850W/VA	1500W/VA	1500W/VA
Battery string voltage:	24VDC	24VDC	48VDC	48VDC	48VDC	48VDC

* At nominal input voltage in and 10A battery charger

General Specifications

Performance

Input voltage range
- 120VAC: 85 to 175VAC* (to 150VAC for FXM 2000)
- 230VAC: 150 to 328VAC* (to 281VAC for FXM 2000)

Output voltage
- Regulation: ±10% over full input voltage range
- Waveform: Pure sine wave

Typical efficiency (full resistive load): >98%
Typical output voltage THD: <3%
Typical transfer time: <5ms
Audible noise @ 1m: 45dBA

*Without going to batteries

Environmental Specifications

Operating temperature: -40 to 74°C (-40 to 165°F)*
Storage temperature: -40 to 75°C (-40 to 168°F)
Operating altitude**: 12,000ft/3658m
Operating humidity: Up to 95%

*Output power for FXM 650 and FXM 1100 is derated by 1.25% per every degree Celsius above 55°C. Output power for the FXM 2000 is derated by 1.0% per every degree Celsius above 50°C.

**Derate 2°C per 1000ft (305m) above 4500ft (1370m)

Mechanical Specifications

	FXM 650	FXM 1100	FXM 2000
Width (in/mm):	17/432	15.5/394	15.5/394
Height (in/mm):	3.47/88	5.22/133	5.22/133
Depth (in/mm):	9/229	8.75/222	8.75/222
Unit weight (lb/kg):	25/11	35/16	35/16

Standard Features

Automatic Voltage Regulation (AVR)
Automatic frequency sensing (60Hz/50Hz)
Remote monitor and control communications options:
Standard RS-232 serial port or optional internal SNMP Ethernet interface
Novus User Software: A user friendly Windows™ based GUI
Emergency Power Off (EPO) input
Variable speed fan with fan failure alarm
Circuit breaker protection on the input and external battery input
Three mounting configurations: wall, shelf or rack
Generator-ready for extended runtime option
Three user inputs: self test, alarm, shutdown
User adjustable charger (off, 3 A, 6 A, 10 A), 10A default
100 historical events logged with time/date stamping
24 month warranty

Shelves

Electrical safety: UL1778, CSA 22.2 No 107.3-03
Marks: $_{c}CSA_{US}$/CE*
EMI: Class A FCC/CISPR [EN 50091-2:1995]

*CE applies to 230 VAC version only

FXM 650

The power connection panel and the control panel can be rotated for ease of connection and use in any mounting position.

Alpha Technologies United States Bellingham, Washington Tel: 360 647 2360 Fax: 360 671 4936 Toll: 1 800 667 8743
Canada Burnaby, British Columbia Tel: 604 430 1476 Fax: 604 430 8908

#048-157-10 (08/2007)

Alpha Technologies reserves the right to make changes to the products and information contained in this document without notice.
Copyright © 2007 Alpha Technologies. All Rights Reserved. Alpha® is a registered trademark of Alpha Technologies. member of The Alpha Group™ is a trademark of Alpha Technologies.

Battery Backup System for Traffic Intersections

1 **Description.** Furnish an Outdoor Hardened Battery Backup System to be installed as a Pad Mount Stand-Alone Battery Backup System.

2 **Materials.** Furnish, assemble, fabricate, or install new corrosion resistant materials in accordance with specifications. Supply a "rack mounted" UPS unit, including a front panel with indicators and control switches.

3. **Functional Requirements.** This specification is for establishing the minimum requirements for a complete emergency battery backup system for use with Light Emitting Diode (LED) Traffic Signal Modules at intersections with NEMA, 170 or 2070 cabinets. The Battery Backup System (BBS) shall include, but not be limited to the following: Inverter/Charger, Batteries, a separate automatic and manually operated Bypass Switch and all necessary hardware and interconnect wiring. The BBS shall be capable of providing power for full run-time operation for an "LED –only" intersection (all colors: red, yellow, green and pedestrian heads) or flashing mode operation and intersection Red LED's. The BBS shall be designed for outdoor applications.

4. **Enclosure Construction:**

Enclosure. The BBS Enclosure shall be capable of being a Side Mount and Pad Mount. The enclosure will house the batteries, UPS and bypass switches. The cabinet must meet the requirements for NEMA 3R enclosures. The housing must have the dimensions so that it may easily be attached the side of a M, P or 332 Type cabinet. Dimensions of the enclosure shall not exceed 50"H x 17" W x 17" D. The UPS enclosure must not interfere with the opening of the traffic cabinet door.

A eight (8) inch Riser option shall be available for Pad Mount installations.

The complete enclosure and door must be made from .125" thick aluminum. All external seams must be continuously welded. The door opening must have a double flange for weather sealing purposes.

a. **Door:** The cabinet must have a door to provide access to the complete cabinet interior. The door must include a continuous piano hinge made of 14-gauge stainless steel and a .120" diameter stainless steel hinge pin. The hinge must be attached to the enclosure and the door with close end pop rivets. The door must have a three (3) point locking mechanism with rollers at the ends for the latch rods. The key lock must be a Corbin cylinder lock with a #2 key. When the door is opened it must have stops at 90, and 130 degrees. A continuous neoprene gasket must be used to weatherproof the enclosure when the door is closed.

b. **Ventilation Fan:** A fan must be mounted in the air baffle at the top of the cabinet with an air outlet built into the overhang. The fan must be thermostatically controlled. The bottom of the door must be louvered to allow airflow. A removable dust filter must be located behind the vent.

c. **Finish:** The enclosure shall be a natural aluminum or painted ASA 61 Gray.

d. **Features:** An "On Battery" factory installed high impact red light option shall be available for the enclosure. The "On Battery" LED shall operate off of the DC voltage of the UPS to notify that the UPS is on batteries without opening of the door. The light will be wired to and controlled by the UPS power module. The enclosure shall be designed to rack mount the UPS and Fail Safe ATS transfer switch. When the UPS is mounted into the enclosure it must be mounted to accommodate straight-on horizontal viewing of the LCD screen on the UPS.

e. **Generator Connection:** An optional factory installed flush mount generator compartment with neoprene gaskets for weatherproofing shall be available for the enclosure. The generator compartment shall include a locking 30 amp plug, L5-30P, for connecting of a portable AC generator. A manual transfer switch shall be mounted within the generator compartment to allow for transferring from utility power to generator power. The generator door will provide a cable slot to allow for closing of the door when the generator is plugged in and to lock the cable inside of the compartment. The door will include a Corbin Type 2 lock.

f. **Mounting:** The cabinet will be mounted to the traffic control cabinet with six 6 hex head bolts, ¼" x 20". All holes will be field drilled by the Contractor to accommodate the specific situation. A grommet must be supplied to protect the cable in a field drilled 1.5" to 2" hole for cable connection to the existing traffic controller. The Contractor will supply all the mounting hardware, bolts, washers, nuts, gaskets, bushings, grommets, caulking, etc., necessary to install the cabinet in a safe and weatherproof manner.
An optional eight (8) inch Riser shall be available for Pad Mount Stand-Alone Installations.

5. Battery System:

a. Individual batteries shall be:
- Voltage rating: 12V type
- Amp-hour rating: 100 amp-hour minimum
- Group size: 31 minimum
- Batteries shall be easily replaced and commercially available off the shelf.

b. Batteries used for BBS shall consist of 4 batteries. All batteries must meet their specifications out of the box immediately after the initial 24-hour top off charge. Batteries that require cycling to meet the AH rating specifications are not acceptable.

c. Batteries shall be deep discharge, sealed prismatic lead-calcium based GEL/VRLA Gelled Electrolyte/ Valve Regulated Lead Acid). Batteries designed for Cycle applications, such as Solar, are not acceptable. The battery must be designed for Standby Applications.

d. Batteries shall have a discharge operating temperature range of – 40 °C to +71 °C.

e. Batteries shall have a Manufactures Warranty of 4 Years Full Replacement plus 1 additional year when a battery balancer is used. The warranty shall cover any battery that does not meet 80% of its original reserve capability during the warranty period.

f. The batteries shall be provided with appropriate interconnect wiring and corrosion-resistant mounting trays, shelf's and/or brackets appropriate for the cabinet into which they will be installed.

g. Batteries shall indicate maximum recharge data and recharging cycles.

h. Battery Harness

1) Battery interconnect wiring shall be via two-part modular harness.

2) Part I shall be equipped with red (+) and black (-) 30.48 cm (12") cabling that can be permanently connected to the positive and negative posts of each battery. Each red and black pair shall be terminated into an Anderson style Power Pole connector or equivalent.

3) Part II shall be equipped with the mating Power Pole style connector for the batteries and a single, insulated Power Pole style connection to the inverter/charger unit. Harness shall be fully insulated and constructed to allow batteries to be quickly and easily connected in any order to ensure proper polarity and circuit configuration.

4) Power Pole connectors may be either one-piece or two-piece. If a two-piece connector is used, a locking pin shall be used to prevent the connectors from separating.

5) All battery interconnect harness wiring shall be UL Style 1015 CSA TEW or Welding Style Cable or equivalent, all of proper gauge with respect to design current and with sufficient strand count for flexibility and ease of handling.

6) Battery terminals shall be covered and insulated with molded boots so as to prevent accidental shorting.

i. Battery Balancer: The battery balancer shall be provided that automatically balances the battery charge voltage on all batteries in the string to within ±100mV between any two batteries. The Balancer shall allow for any single 12V battery within the battery string to be replaced at any time throughout the warranty period and not

require the purchase of new batteries, to install the battery covered under the warranty.

j. The BBS shall provide the ability to manage daylight savings time automatically.
k. The BBS temperature reporting shall be selectable, Celsius or Fahrenheit.
l. The BBS shall have the ability to update the firmware via the Web Pages.
m. The BBS shall be capable of reporting the date in either number or text format in any order of day, month and year.
n. The BBS shall have battery runtime reporting integration based on the current rate of consumption via a selectable collection of common batteries and via generic configuration with editable Peukert's number.
o. The BBS shall display the MAC address locally and remotely.
p. The BBS shall display the unit serial number locally and remotely.
q. The BBS shall display the record the power consumed by the load. (KW)
r. The BBS shall have a user input selectable alarm. An alarm shall be sent via SNMP when activated.
s. The BBS shall have a remote shutdown / reboot via SNMP feature.
t. The BBS shall have up to 255 COM ports available on the RS-232.

6. BBS Operation:

a. The BBS shall provide a minimum four (4) hours of full run-time operation at 500 watts with an additional nine (9) hours of Red Flash operation at 125 watts. Typical values for a "LED-only" intersection. The inverter, when on batteries, shall operate with a minimum efficiency of 84% with a load ranging from 25% to 90% of the BBS total output rating. The BBS shall operate at 97% or higher when operating under normal condition (utility power is available).

b. The BBS, for safety and efficiency shall operate with a nominal 48 VDC buss. A DC level higher then 56 VDC shall be considered unsafe and not acceptable.

c. The maximum transfer time allowed, from disruption of normal utility line voltage to stabilized inverter line voltage from batteries, shall be 5 milliseconds. 5 milliseconds maximum allowable transfer time shall also apply when switching from inverter line voltage to utility line voltage.

d. The BBS shall include a rack mounted Fail Safe Automatic/Manual Bypass Switch for bypassing the UPS for maintenance. The FS-ATS bypass switch will be a 3-stage configuration, UPS Normal mode, bypass UPS On and bypass UPS Off. The FS-ATS Bypass Switch shall mount in a 19" rack inside of the BBS side mount enclosure.

e. The BBS shall provide the user with 6-sets of normally open (NO) and normally closed (NC) single-pole double-throw (SPDT) individually programmable dry relay contact closures, available on a front panel-mounted terminal block, rated at a minimum 120V/1A, and labeled so as to identify each contact.

1) One set of NO and NC contact closures shall be energized whenever the unit switches to battery power. Contact shall be labeled or marked "On Batt."
2) A second and third set of NO and NC contact closures shall be energized whenever the battery approaches approximately 40% of remaining useful capacity. Contact shall be labeled or marked "Low Batt." This setting must be adjustable from 10% to 90% via the RS232 connection.
3) A fourth set of NO and NC contact closures shall be energized two hours after the unit switches to battery power. Contact shall be labeled or marked "Timer." This setting must be adjustable from 1 Min. to 8 Hours via the RS232 connection.
4) A fifth set of NO and NC contact closures shall be energized in the event that an Alarm condition occurs. Contact shall be labeled "Alarm".
5) A 48 VDC output shall be provided for operating an external fan. This output can also be factory configured as a dry contact
6) Relay contact activation shall be annunciated on the front panel via a visual indication. This can be either discreet LED, or part of LCD screen, etc.

f. The BBS shall have (2) independently programmable timers 0 to 8 hours with (2) times-of-day restrictions on each timer, providing dry contacts to provide Red Flash operation at user definable times of day.

g. The BBS shall provide 3 user inputs to support Intrusion Alarm, Emergency Power Off (EPO) and external Self Test (Battery Test).

h. Operating temperature for both the inverter/charger, and manual bypass switch shall be –37 °C to +74 °C with a load of 850 watts.

i. The Fail Safe ATS Bypass Switch shall be rated at 240VAC/30 amps, minimum

j. The BBS shall use a temperature-compensated battery charging system. The charging system shall compensate over a range of 2.5 – 6.0 mV/ °C per cell. The temperature sensor shall be external to the inverter/charger unit. The temperature sensor shall come with 2 meters (6'5") of wire.

k. Batteries shall not be recharged when battery temperature exceeds 50 °C ± 3 °C.

l. BBS shall bypass the utility line power whenever the utility line voltage is outside of the following voltage range: 85VAC to 175VAC (± 2VAC). During a utility input from 85 VAC to 175 VAC the UPS shall utilize its internal double buck, double boost regulation to maintain a 108 to 131 VAC output to the controller cabinet, without the use of the batteries. The BBS shall go into Boost Mode 1 when the AC Line voltage reaches below 110 VAC, +/- 2volts. When the AC line drops below 96 VAC, +/- 2 volts the BBS shall go into Boost Mode 2. When the AC line voltage reaches 131 volts, +/- 2volts the BBS shall go into Buck Mode 1. When the AC Line voltage reaches 150 volts the BBS shall go into Buck Mode 2.

m. When utilizing battery power, the BBS output voltage shall be between 112 VAC and 128 VAC, pure sine wave output, ≤ 3% THD, 60Hz ± 3Hz.

n. BBS shall be compatible with NEMA, 170 or 2170 Controllers, and cabinet components for full time operation. All loads to the maximum rating of the BBS shall be powered through the BBS system to utilize the UPS internal Buck/Boost regulation.

o. In cases of low (below 85VAC) or absent utility line power, when the utility line power has been restored to normal for more than 3 seconds, the BBS shall transfer from the Boost Regulation Mode or the battery backed inverter mode back to utility line mode.

p. In cases of high utility line power (above 175VAC), when the utility line power has been restored to normal for more than 3 seconds, the BBS shall transfer from the Buck Regulation Mode or battery backed inverter mode back to utility line mode

q. BBS shall be equipped to prevent a malfunction feedback to the cabinet or from feeding back to the utility service. For conformation the UPS module must be UL/CSA approved and labeled. "Tested to" or "Built to" UL/CSA is not acceptable.

r. In the event of inverter/charger failure, battery failure or complete battery discharge, the Fail Safe Transfer Switch shall revert to the NC (and de-energized) state, where utility line power or generator power, if available, is connected to the cabinet.

s. Recharge time for the battery, from "protective low-cutoff" to 90% or more of full battery charge capacity, shall not exceed eight (8) hours, unless limited by the Temperature Regulated charger due to excessive battery heat that could damage the integrity of the battery string.

t. Batteries shall be Deep Discharge Gel Type Valve Regulated Lead Acid Battery and compatible with the Battery charger.

7. Maintenance, Displays, Controls and Diagnostics:

a. The BBS shall include a display and /or meter to indicate current battery charge status and conditions.
   1) The BBS shall provide voltmeter standard probe input-jacks (+) and (-) to read the exact battery voltage drop at the inverter input.

b. The BBS shall have lightning surge protection option.

c. The BBS shall be equipped with an integral system to prevent battery from destructive discharge and overcharge.

d. The BBS and batteries shall be easily replaced with all needed hardware and shall not require any special tools for installation.

e. The BBS shall display via an LCD panel to indicate the number of times the BBS was activated and the total number of hours the unit has operated on battery power. The

LCD display shall show the UPS mode, Alarm status, Input and output voltages, Output current, Battery voltage, battery charger current and last event. It shall allow for programming of the battery charger from 3, 6 and 10 amp charger setting.

f. The BBS shall include a RS-232 port for local serial communications on the front panel of the UPS. An optional factory installed internal Ethernet port for SNMP/WEB communications shall be available.

g. The BBS shall include a Microsoft Windows® Graphical User Interface for programming and monitoring the BBS. This must be provided in addition to the use of Hyper Terminal and provided at not cost.

h. Manufacturer shall include a set of operator's manuals with each BBS.

8. Acceptance:

Each BBS shall be manufactured in accordance with a manufacturer Quality Assurance (QA) program. The QA program shall include two Quality Assurance procedures: (1) Design QA and (2) Production QA. The Production QA shall include statistically controlled routine tests to ensure minimum performance levels of BBS units built to meet this specification and a documented process of how problems are to be resolved. The manufacturer, or an independent testing lab hired by the manufacturer, shall perform Design Qualification Testing on new BBS system(s) offered, and when any major design change has been implemented on an existing design. A major design change is defined as any modification, either material, electrical, physical or theoretical, that changes any performance characteristics of the system, or results in a different circuit configuration.

Production Quality Control tests shall be performed on each new system prior to shipment. Failure to meet this requirement shall be cause for rejection. Each system shall be visually inspected for any exterior physical damage or assembly anomalies. Any defects shall be cause for rejection.

9. Materials Warranty:

Manufacturers shall provide a two (2) year factory-repair warranty for parts and labor on the BBS from date of acceptance but not more then 6 months from ship date. Batteries shall be warranted for full replacement for four (4) years from date of purchase with an additional 1-year added when a battery balancer is installed at time of initial installation. A battery shall be considered bad should it not deliver 80% of its original capability within the stated warranty period.

The warranty shall be included in the total bid price of the BBS.

Network Switch

RuggedSwitch™ RS900

9-Port Managed Ethernet Switch with Fiber Optical Uplinks

2006 FROST & SULLIVAN Excellence in Technology Award

The RuggedSwitch™ RS900 is a 9-port industrially hardened, fully managed, Ethernet switch specifically designed to operate reliably in electrically harsh and climatically demanding environments.

The RS900 provides a high level of immunity to electromagnetic interference and heavy electrical surges typical of environments found on plant floors or in curb side traffic control cabinets. An operating temperature range of -40 to +85°C (-40 to +185°F) coupled with hazardous location certification (Class 1 Division 2) allows the RS900 to be placed in almost any location.

The RS900 is packaged in a compact, galvanized steel enclosure that allows either DIN or panel mounting for efficient use of cabinet space. The RS900 provides an integrated power supply with a wide range of voltages (88-300VDC or 85-264VAC) for worldwide operability or dual-redundant, reversible polarity, 24VDC and 48VDC power supply inputs for high availability applications requiring dual or backup power inputs.

The RS900's superior ruggedized design coupled with the embedded Rugged Operating System (ROS™) provides improved system reliability and advanced networking features making it ideally suited for creating Ethernet networks for mission-critical, real-time, control applications.

The versatility and wide selection of fiber optics allows the RS900 to be used in a variety of applications. The RS900 provides up to three 100Mbps fiber optical Ethernet ports for creating a fiber optical backbone with high noise immunity and long haul connectivity.

All RuggedCom products are backed by a five year warranty and unsurpassed technical support.

Features and Benefits

Ethernet Ports

- Up to 9 Ports: 6 Base 10/100BaseTX ports with option for 3 additional Fiber or Copper ports
- Industry standard fiber optical connectors: LC, SC, ST, MTRJ
- Multimode and Singlemode optical transceivers
- Long haul optics allow distances up to 90km

Cyber Security Features

- Multi-level user passwords
- SSH/SSL encryption
- Enable/disable ports, MAC based port security
- Port based network access control (802.1x)
- VLAN (802.1q) to segregate and secure network traffic
- Radius centralized password management
- SNMPv3 encrypted authentication and access security

RuggedRated™ for Reliability in Harsh Environments

- Immunity to EMI and heavy electrical surges
  - Meets IEEE 1613 (electric utility substations)
  - Exceeds IEC 61850-3 (electric utility substations)
  - Exceeds IEC 61800-3 (variable speed drive systems)
  - Exceeds IEC 61000-6-2 (generic industrial)
  - Exceeds NEMA TS-2 (traffic control equipment)
- Hazardous Location Certification: Class 1 Division 2
- -40 to +85°C operating temperature (no fans)
- Conformal coated printed circuit boards (optional)

Rugged Operating System (ROS™) Features

- Simple plug and play operation - automatic learning, negotiation, and crossover detection
- RSTP (802.1w) and Enhanced Rapid Spanning Tree (eRSTP™) network fault recovery (<5ms)
- Quality of Service (802.1p) for real-time traffic
- VLAN (802.1q) with double tagging and GVRP support
- Link aggregation (802.3ad)
- IGMP Snooping for multicast filtering
- Port Rate Limiting and Broadcast Storm Limiting
- Port configuration, status, statistics, mirroring, security
- Industrial automation features (eg. Modbus)

Management Tools

- Web-based, Telnet, CLI management interfaces
- SNMP v1/v2/v3
- Remote Monitoring (RMON)
- Rich set of diagnostics with logging and alarms

Universal Power Supply Options

- Fully integrated power supply
- Universal high-voltage range: 88-300VDC or 85-264VAC
- Dual low-voltage DC inputs: 24VDC (9-36VDC) or 48VDC (36-72VDC)
- Terminal blocks for reliable maintenance free connections
- CSA/UL 60950 safety approved to +85°C

RUGGEDCOM ISO 9001:2000 CERTIFIED

ROS™ Features

ROS Rugged Operating System™

Cyber Security

Cyber security is an urgent issue in many industries where advanced automation and communications networks play a crucial role in mission critical applications and where high reliability is of paramount importance. Key ROS™ features that address security issues at the local area network level include:

- **Passwords** - Multi-level user passwords secures switch against unauthorized configuration
- **SSH / SSL** - Extends capability of password protection to add encryption of passwords and data as they cross the network
- **Enable / Disable Ports** - Capability to disable ports so that traffic can not pass
- **802.1q VLAN** - Provides the ability to logically segregate traffic between predefined ports on switches
- **MAC Based Port Security** - The ability to secure ports on a switch so only specific Devices / MAC addresses can communicate via that port
- **802.1x Port Based Network Access Control** - The ability to lock down ports on a switch so that only authorized clients can communicate via this port
- **Radius** - Provides centralized password management
- **SNMPv3** - encrypted authentication and access security

The ROS™ cyber security features are included to help address the various industry specific security standards such as NERC CIP, ISA S99, AGA 12, IEC 62443, ISO 17799:2005 and PCSRF SPP-ICS.

Enhanced Rapid Spanning Tree Protocol (eRSTP™)

RuggedCom eRSTP allows the creation of fault-tolerant ring and mesh Ethernet networks that incorporate redundant links that are 'pruned' to prevent loops. eRSTP yields worst-case fault recovery[1] of 5ms times the 'bridge diameter' and allows rings of up to 80 switches. For example, a ring of ten switches will have fault recovery times under 50ms. eRSTP implements both STP and RSTP to ensure interoperability with commercial switches unlike other proprietary 'ring' solutions.

Quality of Service (IEEE 802.1p)

Some networking applications such as real-time control or VoIP (voice over IP) require predictable arrival times for Ethernet frames. Switches can introduce latency in times of heavy network traffic due to the internal queues that buffer frames and then transmit on a first come first serve basis. ROS™ supports 'Class of Service' in accordance with IEEE 802.1p that allows time critical traffic to jump ahead to the front of the queue thus minimizing latency and reducing jitter to allow such demanding applications to operate correctly. ROS™ allows priority classification by port, tags, MAC address, and IP type of service (TOS). A configurable "weighted fair queuing" algorithm controls how frames are emptied from the queues.

VLAN (IEEE 802.1q)

Virtual local area networks (VLAN) allow the segregation of a physical network into separate logical networks with independent broadcast domains. A measure of security is provided since hosts can only access other hosts on the same VLAN and traffic storms are isolated. ROS™ supports 802.1q tagged Ethernet frames and VLAN trunks. Port based classification allows legacy devices to be assigned to the correct VLAN. GVRP support is also provided to simplify the configuration of the switches on the VLAN.

Link Aggregation (802.3ad)

The link aggregation feature provides the ability to aggregate several Ethernet ports into one logical link (port trunk) with higher bandwidth. This provides an inexpensive way to set up a high speed backbone to improve network bandwidth. This feature is also known as "port trunking", "port bundling", "port teaming", and "ethernet trunk".

IGMP Snooping

ROS uses IGMP snooping (Internet Group Management Protocol v1&v2) to intelligently forward or filter multicast traffic streams (e.g. MPEG video) to or from hosts on the network. This reduces the load on network trunks and prevents packets from being received on hosts that are not involved. ROS™ has a very powerful implementation of IGMP snooping that:

- Can be enabled on a per VLAN basis.
- Detects and filters all multicast streams regardless of whether subscribers exist.
- Supports "router-less" operation by supporting an "active" mode.
- Restores traffic streams immediately after an RSTP topology change.

SNMP (Simple Network Management Protocol)

SNMP provides a standardized method for network management stations the ability to interrogate devices from different vendors. SNMP versions supported by ROS™ are v1, v2c, and v3. SNMPv3 in particular provides security features (such as authentication, privacy, and access control) not present in earlier SNMP versions. ROS™ also supports numerous standard MIBs (Management Information Base) allowing for easy integration with any network management system (NMS).

[1] eRSTP fault recovery times may be approximated as follows:
For 100 Mbps, fault recovery performance is <5ms/hop
For 1,000 Mbps, fault recovery performance is <5ms/hop + 20ms

ROS™ Features

ROS Rugged Operating System™

SNMP (Simple Network Management Protocol) (cont'd)
A feature of SNMP supported by ROS™ is the ability to generate "traps" upon system events. A NMS can record traps from multiple devices providing a powerful network troubleshooting tool. RuggedVue™ is RuggedCom's NMS that provides graphical visualization of the network and is fully integrated with all RuggedCom products.

SNTP (Simple Network Time Protocol)
SNTP automatically synchronizes the internal clock of all ROS™ devices on the network. This allows for correlation of time stamped events for troubleshooting.

SCADA and Industrial Automation
ROS™ contains features that optimize network performance and simplify switch management based on the unique requirements found in SCADA and industrial automation applications. Features such as Modbus TCP management for retrieval of switch data using the ubiquitous Modbus protocol and DHCP Option 82, a Rockwell Automation ODVA requirement for IP address assignment based on the location of the end device, provide capabilities not found in typical "commercial" or "office grade" Ethernet switches.

Port Based Network Access Control (802.1x)
ROS™ supports the IEEE 802.1x standard that defines a mechanism for port-based network access control which provides a means of authenticating and authorizing devices attached to LAN ports.

Port Rate Limiting
ROS™ supports configurable rate limiting per port to limit unicast and multicast traffic. This can be essential to managing precious network bandwidth for service providers. It also provides edge security for denial of service (DOS) attacks.

Broadcast Storm Filtering
Broadcast storms wreak havoc on a network and can cause attached devices to malfunction. This could be disastrous on a network with mission critical equipment. ROS™ limits this by filtering broadcast frames with a user-defined threshold.

Loss of Link Management
Some intelligent electronic devices (IEDs) have dual fiber optic ports with automatic failover to a backup port should the primary fail. ROS™ ensures this mechanism works reliably under all failure modes by appropriately disabling link signals when required. ROS™ also flushes learned MAC addresses to ensure the failover occurs quickly.

Port Mirroring
ROS™ can be configured to duplicate all traffic on one port to a designated mirror port. When combined with a network analyzer, this can be a powerful troubleshooting tool.

Port Configuration and Status
ROS™ allows individual ports to be 'hard' configured for speed, duplex, auto-negotiation, flow control and more. This allows proper connection with devices that do not negotiate or have unusual settings. Detailed status of ports with alarm and SNMP trap on link problems aid greatly in system troubleshooting.

Port Statistics and RMON (Remote Monitoring)
ROS™ provides continuously updating statistics per port that provide both ingress and egress packet and byte counters as well as detailed error figures. Also provided is full support for the RMON statistics, history, alarms, and event groups. RMON allows for very sophisticated data collection, analysis and detection of traffic patterns.

Event Logging and Alarms
ROS™ records all significant events to a non-volatile system log allowing forensic troubleshooting. Events include link failure and recovery, unauthorized access, broadcast storm detection, and self-test diagnostics among others. Alarms provide a snapshot of recent events that have yet to be acknowledged by the network administrator. An external hardware relay is de-energized during the presence of critical alarms allowing an external controller to react if desired.

HTML Web Browser and Telnet User Interfaces
ROS™ provides a simple, intuitive user interface for configuration and monitoring via a standard graphical web browser or via Telnet. All system parameters include detailed on-line help to make setup a breeze. ROS™ , presents a common look and feel and standardized configuration process allowing easy migration to other RuggedCom managed products.

Configuration via ASCII Text File
All configuration parameters are stored in an ASCII formatted text file that can easily be transferred via TFTP or Xmodem. The configuration file can be saved for backup purposes and easily manipulated by a text editor. The same text file can be downloaded to the switch at a later date in order to re-configure or restore a previous configuration.

Command Line Interface (CLI)
A command line interface can be used in conjunction with remote shell to automate data retrieval, configuration updates, and firmware upgrades. A powerful SQL-like capability allows expert users the ability to selectively retrieve or manipulate any parameters the device has to offer.

Technical Specifications

Power Supply
- Power Consumption: 10W MAX
- 24VDC: 9-36 VDC, 0.4A
- 48VDC: 36-72 VDC, 0.2A
- HI Voltage AC/DC: 88-300VDC, 85-264VAC, 0.1A

Critical Alarm Relay
- Form-C failsafe contact relay: 1A@30VDC

Physical
- Height:18.8cm / 7.4"
- Width: 6.6cm / 2.6"
- Depth: 12.7cm / 5.0"
- Weight: 1.22kg / 2.7lbs
- Ingress Protection: IP40 (1mm objects)
- Enclosure: 20 AWG galvanized steel enclosure
- Mounting: DIN rail or panel mounted

Switch Properties
- Switching method: Store & Forward
- Switching latency: 8 us (100Mbps)
- Switching bandwidth: 1.8Gbps
- MAC address table size: 16kbytes
- Priority Queues: 4
- Frame buffer memory: 1 Mbit
- VLANs: 4096
- IGMP multicast groups: 256
- Port rate limiting: 128kbps, 256, 512, 4, 8Mbps
- No head of line blocking

Approvals
- Hazardous Locations: Class 1, Division 2
- ISO: Designed and manufactured using a ISO9001: 2000 certified quality program
- CE Marking
- Emissions: FCC Part 15 (Class A), EN55022 (CISPR22 Class A)
- Safety: cCSAus (Compliant with CSA C22.2 No. 60950, UL 60950, EN60950)
- Laser Eye Safety (FDA/CDRH): Complies with 21 CFR Chapter1, Subchapter J.

EMI Immunity and Environmental Compliance
- IEC 61000-6-2 Industrial (Generic)
- IEC 61800-3 Industrial (Variable Speed Drive Systems)
- IEC 61850-3 Electric Utility Substations
- IEEE 1613 Electric Utility Substations
- NEMA TS 2 Traffic Control Equipment

Warranty
- 5 Years-Applicable to design or manufacturing related product defects.

Network Management
- ROSVue HTTP graphical web-based
- SNMP v1, v2c, v3
- Telnet, VT100
- Command Line Interface (CLI)

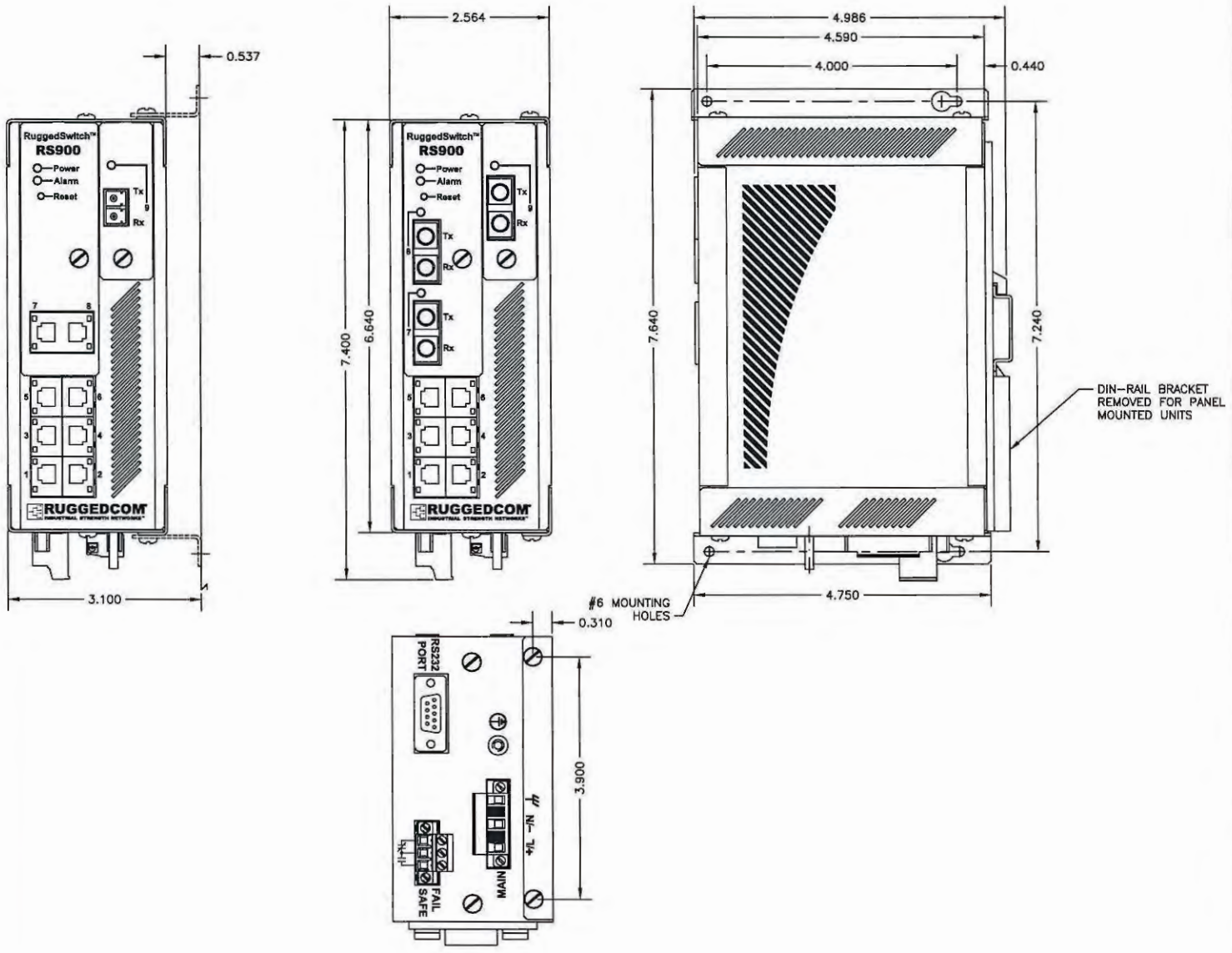
IEEE Compliance
- 802.3-10BaseT
- 802.3u-100BaseTX, 100BaseFX
- 802.3x-Flow Control
- 802.3z-1000BaseLX
- 802.3ab-1000BaseTX
- 802.3ad-Link Aggregation
- 802.1d-MAC Bridges
- 802.1d-Spanning Tree Protocol
- 802.1p-Class of Service
- 802.1q-VLAN Tagging
- 802.1w-Rapid Spanning Tree Protocol
- 802.1x-Port Based Network Access Control

IETF RFC Compliance
- RFC768-UDP
- RFC783-TFTP
- RFC791-IP
- RFC792-ICMP
- RFC793-TCP
- RFC826-ARP
- RFC854-Telnet
- RFC894-IP over Ethernet
- RFC1112-IGMP v1
- RFC1519-CIDR
- RFC1541-DHCP (client)
- RFC2030-SNTP
- RFC2068-HTTP
- RFC2236-IGMP v2
- RFC2284-EAP
- RFC2475-Differentiated Services
- RFC2865-Radius
- RFC3414-SNMPv3-USM
- RFC3415-SNMPv3-VACM

IETF SNMP MIBS
- RFC1493-BRIDGE-MIB
- RFC1907-SNMPv2-MIB
- RFC2012-TCP-MIB
- RFC2013-UDP-MIB
- RFC2578-SNMPv2-SMI
- RFC2579-SNMPv2-TC
- RFC2819-RMON-MIB
- RFC2863-IF-MIB
- draft-ietf-bridge-rstpmib-03-BRIDGE-MIB
- draft-ietf-bridge-bridgemib-smiv2-03-RSTP-MIB
- IANAifType-MIB

Fiber Specifications and Mechanical Drawing

Fiber Optical Specifications				
Parameter	Fiber Port Type			
Mode	Multimode	Singlemode		
Connectors	MTRJ / ST / SC / LC	LC / SC / ST		
Typical Dist. (km)	2	20	50	90
Optical Wavelength (nm)	1310	1310		
Cable SizeCore/Cladding (um)	50 or 62.5/125	8 or 9/125		
Tx Power (dBm)	-15.7	-15.5	-2.5	2.5
Rx Sensitivity (dBm)	-33.5	-32	-37	-39
Typical Budget (dB)	17	16.5	34.5	41.5
Longer segment lengths dependent on fiber specifications. Consult factory for further details.				



Order Codes

RS900 -__ - __ - __ - __ - __ - __
PS M P7 P8 P9

PS: Power Supply
- 24 = 24 VDC (9-36 VDC)
- 48 = 48 VDC (36-72 VDC)
- HI = 85-264VAC or 88-300VDC

M: Mounting Option
- D = DIN RAIL
- P = PANEL MOUNT
- N = NONE

P7, P8, P9: Port 7-9 Options*
- 00 = No port
- TX = 10/100TX (if selected, port 7&8 must both be TX)
- MJ = Multimode 1300nm, MTRJ connector
- MC = Multimode 1300nm, SC connector
- MT = Multimode 1300nm, ST connector
- ML = Multimode 1300nm, LC connector
- T2 = Singlemode 1310nm, ST connector, Standard 20km
- L2 = Singlemode 1310nm, LC connector, Standard 20km
- L5 = Singlemode 1310nm, LC connector, Intermediate Reach 50km
- L9 = Singlemode 1310nm, LC connector, Long Reach 90km
- C2 = Singlemode 1310nm, SC connector, Standard 20km
- C5 = Singlemode 1310nm, SC connector, Intermediate Reach 50km
- C9 = Singlemode 1310nm, SC connector, Long Reach 90km

*Note:If P7 and P8 are selected, they must have the same connector type.

Example Order Codes

- RS900-24-D-000000
- RS900-24-D-TXTX00
- RS900-48-P-TXTXMT
- RS900-HI-D-C20000
- RS900-HI-D-L2L200
- RS900-HI-N-C5C5C9

Options

82-01-0002 - Conformal Coating

RuggedCom Inc.
30 Whitmore Road
Woodbridge, Ontario, Canada L4L 7Z4
Tel: (905) 856-5288 **Fax:** (905) 856-1995
Toll Free: (888) 264-0006
Technical Support Center: (866) 922-7975 or (954) 922-7975

© 2008 RuggedCom Inc.
RuggedSwitch is a trademark of RuggedCom Inc.
Ethernet is a trademark of the Xerox Corporation.
Patent Pending
All specifications in this document are subject to change without notice.
Rev 2-P

For additional information on our products and services, please visit our web site at: www.ruggedcom.com

Video Encoder

the i-Volution™ 4100
HARDENED ENCODER

The i-Volution 4100 (i4100) Video-over-IP encoder delivers outstanding performance for advanced surveillance applications requiring high resolution, full motion video. The i4100 can encode a single MPEG-1/MPEG-2 video stream and two serial data channels for transport over a standards-based IP network. The MPEG video stream can be viewed simultaneously from any PC and/or CCTV monitor in the network.

The i4100 is available as a stond-alone single port video encoder.

Front View

Back View

applications

- Security Surveillance
  - Airports
  - Military
  - Industrial Complexes
  - Hospitals
  - Campuses
  - Detention Centers
- Transportation Monitoring
  - Road (ITS)
  - Rail/Light Rail
  - Subway/Metro
- Industrial Process Control

High Resolution - Full Motion Video

Impath Networks i4100 provides the highest digitized video quality over standard IP Ethernet networks. Every image is encoded in real-time and displayed at 30/25 (NTSC/PAL) frames per second. This advanced capability provides full motion DVD quality video for digital CCTV surveillance applications.

Single Channel Capacity

The i4100 provides single-channel video for surveillance applications supporting dispersed video cameras over an IP network. The two serial data ports provide additional support for PTZ, NMS and Point of Sales applications.

Network Scalability and Flexibility

The stand-alone i4100 encoder is ideal for a multitude of surveillance applications requiring single channel flexibility and high quality full motion video. Advanced features such as On-Screen-Display (OSD) allows network administrators to display camera name, date, time, resolution, bit rate and other related information onto any video monitor in the network. When used in combination with the Video Motion Detection feature, the i4000 provides effective, real-time surveillance and alarm notification.

Enhanced IP Multicast Capability - Video & Data

i-Volution simplifies network connectivity via standards-based multicast technology for streaming video and data within an IP network. IP Multicasting provides the ability to distribute information efficiently to an unlimited number of remote locations via a single communications interface at the central site. This flexibility reduces hardware and bandwidth requirements while optimizing the overall network.

Temperature Hardened

The i4100 is designed to meet high availability network requirements. The unit is environmentally hardened to operate over extended operating ranges and is conformal coated to ensure maintenance free operation.

Standards Compliant

Video is encoded using standard MPEG-1/MPEG-2 compression. The video stream(s) can be viewed by iMPath software/hardware decoders and/or 3 Party products. The video and serial data can be transmitted over any standard IP network. This includes Ethernet, Gigabit Ethernet, SONET/SDH and ATM networks.

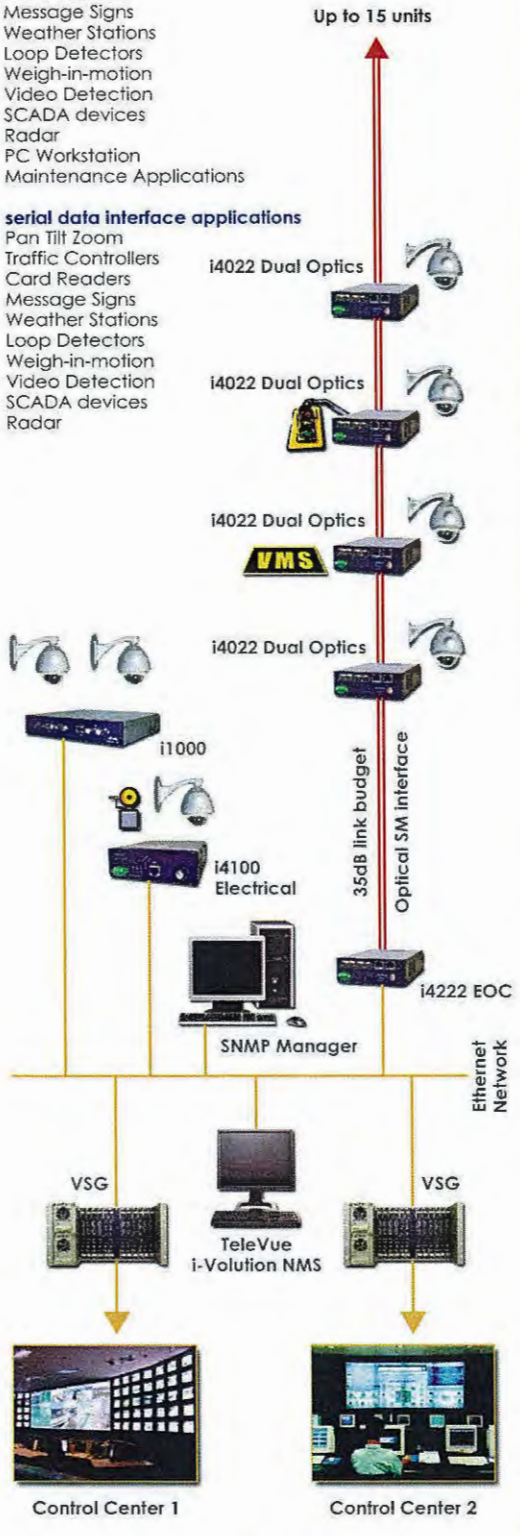
Network Manageability

The i4100 can be managed both locally and remotely using Telnet, i-Volution NMS or via 3 Party SNMP network management systems.

the i-Volution™ 4100
HARDENED ENCODER

ethernet interface applications
Pan Tilt Zoom
Traffic Controllers
Card Readers
Message Signs
Weather Stations
Loop Detectors
Weigh-in-motion
Video Detection
SCADA devices
Radar
PC Workstation
Maintenance Applications

serial data interface applications
Pan Tilt Zoom
Traffic Controllers
Card Readers
Message Signs
Weather Stations
Loop Detectors
Weigh-in-motion
Video Detection
SCADA devices
Radar



Video

Analog Video	NTSC (30 fps), PAL (25 fps)
Connector	BNC, 75 ohm
IP connectivity	Unicast and Multicast (UDP)
Digital Encoding	MPEG-1 (ISO/IEC 11172-2) and MPEG-2 (ISO/IEC 13818-1 Transport Stream or ISO/IEC 13818-2 Elementary Steam) MP@ML
Data Rate	128 kbps to 8 Mbps in Transport Stream and up to 12 Mbps in Elementary Stream

Resolution	NTSC	PAL
Full	720 x 480	720 x 576
HHR	352 x 480	352 x 576
SIF	352 x 240	352 x 288
QSIF	192 x 128	160 x 128
Latency	170ms with Optimal Setting	

Data

Format	Serial / Asynchronous
IP Connectivity	Unicast and Multicast (UDP)
Connectors	(2) DB9-F
Interface	EIA-232, EIA-422/485 - 2 or 4 Wire, Half or Full Duplex software programable
Data Rate	300bps to 115.2 kbps

LAN

LAN Format	IEEE 802.3 Ethernet
Interface	RJ 45 10/100 Base-T Ethernet, Half/Full Duplex, Auto-Sensing
Protocol	TCP, UDP, IPv4, IGMPv2, RTP, Diffserv, SAP, SNMPv2

Motion Detection

Zone	Full Screen
Sensitivity	User Selectable: Low to High (1 to10)
Re-Arm Delay	User Selectable:100ms to 25 seconds

Contact Sense & Closure

Connector	Terminal Block
Contact Sense	Output Voltage: +5 VDC, Maximum Resistance: 1.2 K Ohms
Dry Contact	Off Leakage: < 1 nA, On Resistance: 1.5 Ohms
Maximum Rating	250 Vp / 150 mA
Re-Arm Delay	User Selectable: 100ms to 25 Seconds

Alarms

Via NMS/SNMP	Video Loss Detection Video Motion Detection Contact Sense & Closure Unit Configuration Change / Unit Reset

Management

Local Management	Via Serial (Console) Maintenance Port, LED Status Display
Remote Management	Via i-Volution NMS (TeleVue), Telnet, SNMPv2
Software Updates	Via Network Download - One or multiple units simultaneously

Power

Input Voltage	11.4 - 15 V DC (.100" center pin diameter lock type connector.) *AC Power Adaptor included*
Consumption	8.5 W (typical)

Physical

Size/Weight	W 5.0" (12.7cm) x H 1.72" (4.37 cm) x L 7.5" (19 cm) / 1.34 lbs (0.6 kg)

Environmental

Operating Temperature	-34° C to +74° C
Relative Humidity	5% to 95%, Non-Condensing
Environmental Protection	PCB Conformal Coating
RoHS Compliance	EU directive 2002/95/EC *Available on request*

Regulatory Approvals

Emissions	
Europe	EN55022: 1998 For Class A, EN61000-3-2: 1995 & EN6100-3-3: 1995
North America	FCC47 CFR Part 15, Subpart B: 1999 Class A
Australia/New Zealand	AS/NZS 3548: 1995 for Class A
Immunity	EN55024

Variant	Video port	Data port	Ethernet posts	Optical ports
i4110	1	2	1	0
Other i4000 Variants - Refer to individual datasheets				
i4020 Dual Ethernet	1	2	2	0
i4021 Single Optics	1	2	2	1
i4022 Dual Optics	1	2	2	2
i4221 Single EOC	0	0	2	1
i4222 Dual EOC	0	0	2	2

Impath Networks Ltd. 9 Camelot Drive, Suite 100, Ottawa, Ontario, Canada K2G 5W6
Phone:613.226.4000 Fax:613.226.4602 impathnetworks.com

Copyright 2007 Impath Networks Ltd. Impath is a registered trademark of Impath Networks Ltd. TransPorter, TeleVue, ClientVue and i-Volution are trademarks of Impath Networks Ltd. All other trademarks are those of their respective owners. Printed in Canada —05/07. Specifications subject to change without notice or obligation. 04mbr_140_101_4100.pdf

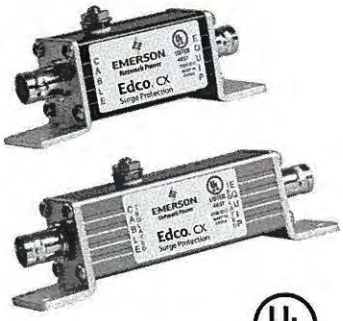
Video Surge Protection

Edco CX Series

CCTV & Data Applications/Coax

The Edco CX06-M & CX06-MI Surge Protective Devices (SPDs) implement three-stage hybrid technology. The SPDs address over-voltage transients with a primary Gas Discharge Tube (GDT), and secondary Silicon Avalanche Diode (SAD) components. Over-current protection, e.g. sneak and fault currents, are mitigated with solid-state resettable fuses — PTCs.

The Edco CX06-M & CX06-MI SPDs are designed in accordance with NFPA 780 (2004 edition) requirements, with up to 20 kA of surge current capability. The Edco CX06-MI model has an isolated ground and is recommended for use at the camera end.



497B

Features

- Sneak/fault current protection
- Low insertion loss
- Shielded case
- CX-06-MI has an isolated ground
- 5 year warranty

General Technical Specifications

Operating Voltage		5 VDC
Clamping Voltage		6 VDC
Operating Current		0.15 A
Peak Surge Current		20 kA (8 x 20 µs)
Frequency Range		0 to 20 MHz
Insertion Loss		< 0.1 dB at 20 MHz
SPD Technology		GDT, SAD, w/Series PTC
Connection Type		BNC, 50/75 Ohm
Operating Temperature		-40°C to +85°C
Dimensions (Inches)	M = 1.5H x 1W x 3.25L	MI = 1.5H x 1W x 4L
Weight		M = 2.3 oz MI = 3 oz
Certifications		UL 497B

Ordering Information

Head-End	CX06-M
Camera-End	CX06-MI

EMERSON
Network Power

Installation

Edco CX06-M: Head-End Equipment Protection

A. Connect the Edco CX06-M in line with the coaxial cable. The side labeled "EQUIP" should be connected to the adjacent head-end equipment.

B. Connect incoming coaxial cable to the side of the Edco CX06-M labeled "CABLE".

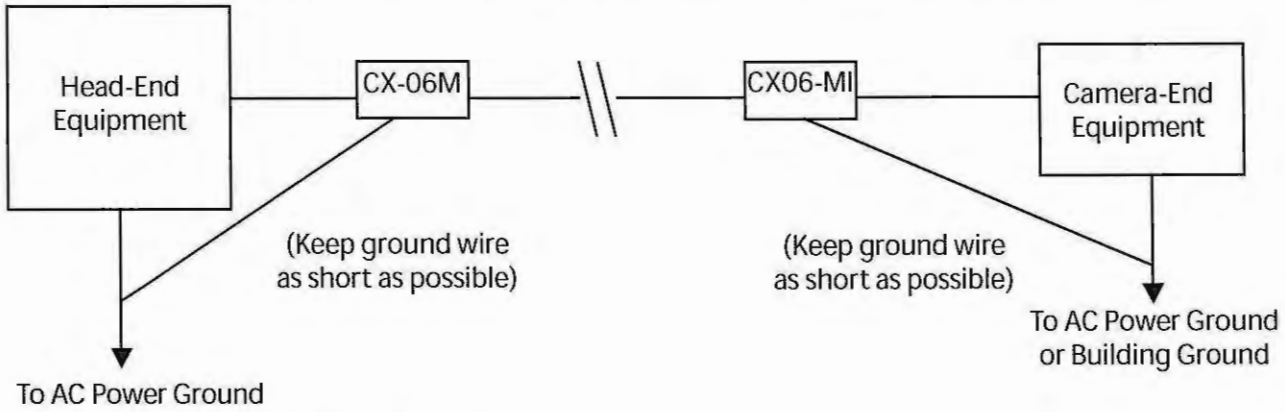
C. Connect a ground wire (10-12 AWG) between the Edco CX06-M ground terminal and the AC power ground of head-end equipment. Keep this wire as short and straight as possible.

Edco CX06-MI: Camera-End Protection

A. Connect the Edco CX06-MI in line with the coaxial cable. The side labeled "EQUIP" should be connected to the adjacent camera.

B. Connect incoming coaxial cable to the side of the Edco CX06-MI labeled "CABLE".

C. Connect a ground wire (10-12 AWG) between the Edco CX06-MI ground terminal and either the AC power ground or equipment building ground at the camera location. Keep this wire as short and straight as possible.



Read and Understand These Instructions:

These protectors are intended for indoor use on communication loop circuits which have been isolated from the Public Switch Telephone Network.

The communication loop circuits shall not be exposed to accidental contact with the electric light or power conductors. The protectors shall be installed per the applicable requirements of the National Electric Code, ANSI/NFPA 70.

Emerson Network Power.
The global leader in enabling Business-Critical Continuity™.

- AC Power
- Connectivity
- DC Power
- Embedded Computing
- Embedded Power
- Monitoring
- Outside Plant
- Power Switching & Control
- Precision Cooling
- Racks and Integrated Cabinets
- Services
- **Surge Protection**

Emerson Network Power Contact information

www.emersonnetworkpower.com

Headquarters
Surge Protection
328 Water Street
Binghamton, NY 13901
T: (607) 721-8840
T: (800) 288-6169
F: (607) 722-8713
E: contactsurge@emerson.com

650 SW 27th Avenue
Ocala, FL 34471
T: (352) 732-3029
T: (800) 648-4076
F: (352) 867-1237

EMERSON.
Network Power

IO-50107 2/09 Rev. 2 Printed in USA

Business-Critical Continuity, Emerson Network Power and the Emerson Network Power logo are trademarks and service marks of Emerson Electric Co. ©2009 Emerson Electric Co.

Pole Mount Cabinet

336 Controller Cabinet

336A Standard
336S Stretch

Stretch

Standard

Overview

McCain's 336 Controller Cabinet is a versatile, compact, and rugged cabinet that can be either base, pedestal or pole mounted. This cabinet meets all Caltrans and Federal Highway Administration (FHWA) requirements. Convenient access to all interior assemblies and field terminations is available through two access doors, one front and one back. The cabinet is compatible with 170 or 2070 controllers and comes equipped with a 19-inch Electronics Industry Alliance (EIA) rack. The 336 cabinet shares many of the features of larger cabinets but with the added benefit of its small and compact design. The cabinet is also available in a taller version (336S) that provides approximately six inches of additional rack space.

Benefits

- Compact size and versatile standard features promote maximum flexibility for intersection planning
- Standard assemblies assure interchangeability between manufacturers
- Variety of mounting positions increases flexibility and options for intersection design
- Available anti-graffiti coating reduces the effects of vandalism
- Available in standard (336A) and stretch (336S) models to meet your housing needs

Product Description

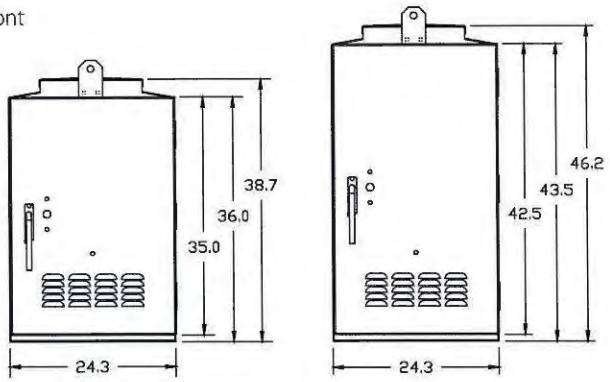
The McCain 336 Controller Cabinet provides a unique advantage over its larger counterparts through its compact and versatile design. This cabinet can house all of the equipment necessary to control an eight phase, four pedestrian operation with two overlaps while still offering flexible mounting options.

Its 12 loadswitch positions can all be programmed ("Yellow/Red", "All Red", or "No Flash") and a police panel comes standard with "On/Off" and "Auto/Flash" switches. This cabinet also features two railroad and four emergency vehicle preemption inputs, provides 16 detector channels (one per left turn, three per through movement), and is compatible with two-channel or four-channel detectors.

Flexible assembly set-up allows the 24 VDC power supply and Power Distribution Assembly (PDA) to be combined as one assembly or left as separate assemblies.

336 Controller Cabinet

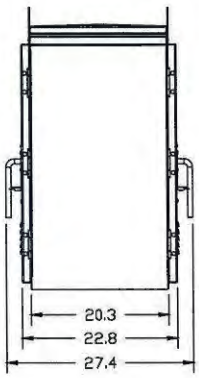
Front



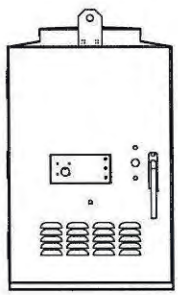
336A Standard

336S Stretch

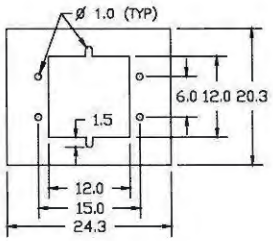
Side



Back



Base



Base dimensions are the same on the standard and stretch models.

Dimensions rounded to the nearest 0.1"

Standard Features

- 8-phase, 4-pedestrian operation (2 overlaps)
- 16 detector channels (1 per left turn, 3 per through movement)
- 2-channel or 4-channel industry standard detection modules
- Railroad preemption inputs, AC isolation (2)
- Emergency vehicle preemption inputs (4)
- Programmable "Yellow/Red", "All Red" or "No Flash" available for all loadswitch positions
- DC isolation inputs for pedestrian push buttons and special functions
- 210 Signal Monitor slot

Assemblies

- 14-position input file
- 12-position output file
- 24 VDC power supply
- Power Distribution Assembly (PDA-2) with combined power supply
- Flash transfer relay sockets (4)
- Dual-circuit flasher positions (2)
- Service panel
- Police panel with signal "On/Off" and "Auto/Flash" switches
- Controller shelf

General Specifications

Dimensions:	39" H x 24" W x 20" D (rounded to the nearest inch)
Material:	5052-H32 aluminum, 0.125" thick
Finishes:	Natural, powder coat (standard, anti-graffiti, and custom colors), anodized
Access:	Front door (1), back door (1), both full size
Latching System:	3-point, choice of Corbin or Best locks
Handles:	3/4" round, stainless steel, with padlock feature
Door Stops:	90° and 180° (±10°), each door, bottom
Rack Assembly:	Removable 19" EIA rack
Ventilation:	Thermostatically controlled 100 CFM fan Louvered air intake in door, pleated filter
Mounting:	Base, pedestal, or side of pole mounting
Shipping Weight:	265 lbs without plug-ins or controller(s)

Options

- Mounting equipment: anchor bolts for base mounting (4), brackets for side pole mounting, and hardware for pedestal mounting
- Removable aluminum hex key door handle
- 336S stretch option available:
  Dimensions: 46" H x 24" W x 20" D (rounded to the nearest inch)
  Shipping Weight: 280 lbs without plug-ins or controller(s)
- Auxiliary output file (336S only)
- Various additional options available, please contact McCain

To learn more about McCain's Integrated Traffic Solutions, please contact info@mccain-inc.com or call (760) 727-8100

McCain®

© 2008 McCain Inc. Updated 10/03/08. McCain reserves the right to change product specifications without notice. For the most up-to-date information, please contact McCain.

Data Surge Protection with Base

Data/Signal/Multiple Medium — PC642 Series

The **PC642 Series** surge suppressor is a dual pair (four wire) module implementing three-stage hybrid technology. This module addresses over voltage transients with gas tubes and silicon avalanche components. In addition, sneak and fault currents are mitigated with resettable fuses (PTCs). The PTCs increase resistance several orders of magnitude when over currents exceed safe levels. A normal state resumes when over currents are removed. The ability to self restore in this manner significantly increases suppressor performance and survivability.

497B

The **PC642** card edge module is gold-plated, double sided and is designed to mate with the **PCB1B** gold-plated female terminal connector (sold separately). When snapped together, the data circuits "pass thru" the protector in a serial fashion from the four "Field Side" terminals to the four "Electronics Side" terminals. Terminals 1 or 10 of the **PCB1B** must be attached to building approved ground.

FEATURES

- Lightning Protection for Low Voltage Data Signal Lines
- Three-Stage Protection
- Sneak/Fault Current Protection
- Resettable Solid-State Fuses – PTC's
- Low Capacitance Option – For High Speed Data
- Plug-in Module / Requires PCB1B Base
- Fast Response Time
- UL Listed 497B

Caution: The hybrid design of this product includes series resistance. Do not place this product in service on any signal line capable of supplying more than 150 milliamperes continuously.

SPECIFICATIONS

Peak Surge Current (10 times):
- 8x20µs 10kA
- 10x700µs ..... 500A per line

Life Expectancy:
- 8x20µs (2000A) ..... >100 occurrences
- 10x700µs (400A)

Response Time ..... <1ns
Voltage Clamp 8,15,20,30,36,43,50,60
Technology..... SAD Hybrid
Resistance ..... 5Ω (typical)
Capacitance (typical)
- Standard models..... 1500pf
- Low Capacitance Models..... 50pf

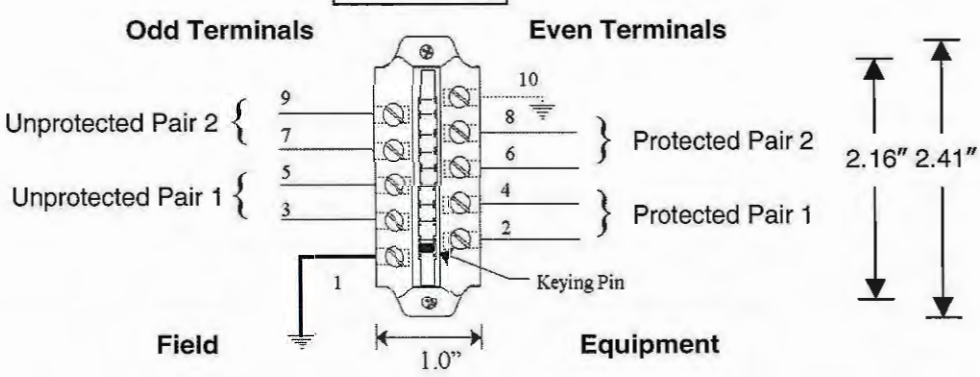
Operating Temperature ..... -40°C to +85°C
Weight ..... 2 oz.
Dimensions PC642 and PCB1B:
- H x W x L ..... 1.8" x 1.0" x 2.4"

© EDCO 2005

Data/Signal/Multiple Medium — PC642 Series

INSTALLATION INSTRUCTIONS

PCB1B



Ground Terminal **1** or **10** (internally tied together)to Building Approved Ground. (See EDCO Tech Bulletin #2015)

PCB1B accommodates 24 to 10 AWG wire

Read and Understand These Instructions:

These protectors are intended for indoor use on communication loop circuits which have been isolated from the Public Switch Telephone Network.

The communication loop circuits shall not be exposed to accidental contact with the electric light or power conductors. The protectors shall be installed per the applicable requirements of the National Electric Code, ANSI/NFPA 70.

ORDERING INFORMATION

APPLICATION:

4-20 ma:	PC642C-036 & PCB1B
RS232:	PC642C-020 & PCB1B
RS485, RS422:	PC642C-008LC & PCB1B
RS423, Token Ring:	PC642C-008LC & PCB1B
E-NET, 10 BASE T:	PC642C-030LC & PCB1B

PC642C-[ ][ ]

Voltage Clamp

8 Volts.....008
15 Volts.....015
20 Volts.....020
30 Volts.....030
36 Volts.....036
43 Volts.....043
50 Volts.....050
60 Volts.....060

No suffix, 2nd stage clamp, ea. L-to-G	
2nd stage clamp L-to-L only	D
2nd stage clamp, L-to-L and ea. L-to-G	X
Low capacitance option, 2nd stage clamp, L-to-L and ea. L-to-G	LC

© EDCO 2005

Low Voltage Power Protection

Alarm/Sound/Video Products

FAS-1 and FAS-2 Series
Camera Power Line
Post-Indicator Valve Circuit
Bell, Horn, Strobe Circuit

FEATURES
• Lightning Protection for Low-Voltage Data/Signal Lines
• Multi-Stage Protection
• Common Mode and Differential Protection Mode
• Automatic Recovery
• Fast Response Time
• UL 497B Listed

UL® 497B

SPECIFICATIONS	
Peak Surge Current (10 Times):	
8 x 20µs	10kA (2500A per line)
10 x 700µs	500A per line
Life Expectancy:	
8 x 20µs (2000A)	›100X
10 x 700µs (400A)	›100X
Response Time	‹1ns
Clamping Voltage	18, 33, 43 or 60V
Technology	SAD Hybrid
Series Resistance	0.2 Ohms/pr.
Capacitance (average)	1500pf
Operating Temperature	–40°C to +85°C
Weight	4 oz.
Dimensions (inches): H x W x L	
(–1)	2.0 in. x 1.5 in. x 1.0 in.
(–2)	2.0 in. x 2.0 in. x 1.5 in.

Keeping You Connected!

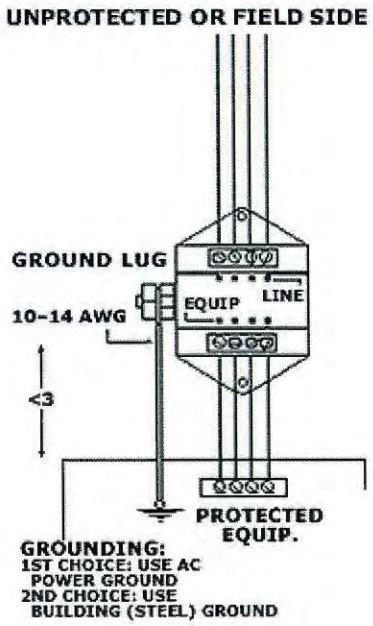
NEED HELP?
Call 1-800-648-4076
1805 N.E. 19th Avenue
P.O. Box 1778
Ocala, Florida 34478
(352) 732-3029
FAX (352) 867-1237
Sales: 1-800-648-4076
E-mail us at:
edco@edcosurge.com
Internet:
http://www.edcosurge.com

EMERSON. Network Power

Alarm/Sound/Video Products

FAS-1 and FAS-2 Series
Camera Power Line
Post-Indicator Valve Circuit
Bell, Horn, Strobe Circuit

INSTALLATION



ORDERING INFORMATION

12VDC use:	**FAS-1-018HC** (single pair) **FAS-2-018HC** (two pair)
24VDC use:	**FAS-1-033HC** (single pair) **FAS-2-033HC** (two pair)
24VAC use:	**FAS-1-043HC** (single pair) **FAS-2-043HC** (two pair)
48V Systems use:	***FAS-1-060HC** (single pair) ***FAS-2-060HC** (two pair)

*THESE MODELS NOT UL LISTED
Caution: The hybrid design of this product includes series resistance. Do not place this product in service on any signal line capable of supplying more than 2.5 Amperes continuously.

Keeping You Connected!

NEED HELP?
Call 1-800-648-4076
1805 N.E. 19th Avenue
P.O. Box 1778
Ocala, Florida 34478
(352) 732-3029
FAX (352) 867-1237
Sales: 1-800-648-4076
E-mail us at:
edco@edcosurge.com
Internet:
http://www.edcosurge.com

EMERSON. Network Power

Camera

1. CCTV systems should include composite video/data cable (camera to cabinet) and power supply and surge control panel interface:

    - 60 ft. Composite Cable Assy.: BH-CCTV-60-CONN Blackhawk 1
    - 230ft. Composite Cable Only: BH-CCTV-230
    - Power supply for dome and adapter for dome: PRO-SCP-1

2. Parapet Mount and Astro Bracket for strapping to Mast Arm

Dome Color Camera

VICON

Corporate Headquarters
89 Arkay Drive
Hauppauge, New York 11788
631-952-CCTV (2288)
800-645-9116
Fax: 631-951-CCTV (2288)

Vicon Europe Headquarters
Brunel Way
Fareham, PO15 5TX
United Kingdom
+44 (0) 1489 566300
Fax: +44 (0) 1489 566322

GVicon Germany GmbH
Kornstieg 3
D-24537 Neumuenster
Phone: +49 (0) 4321 8790
Fax: +49 (0) 4321 879 97

Far East Office
Unit 5, 17/F, Metropole Square
2 On Yiu Street, Shatin
New Territories
Hong Kong
(852) 2145-7118
Fax: (852) 2145-7117

www.vicon-cctv.com

SurveyorVFT-PRS
PRESSURIZED CAMERA DOME SERIES

Pressurized version of the popular Surveyor line allows for use in the most challenging environments

- Sealed and pressurized housing offers maximum environmental protection
- Impact-resistant polycarbonate dome; pendant or wall mount available
- Provides indoor or outdoor environmental control for SurveyorVFT Camera Dome
- Versions available with high-resolution color 22X or day/night 23X or 35X
- RS-422/485 or coaxial PTZ control; available with TCP/IP, fiber and UTP transmission card options
- High-resolution of 540 TV lines (23X/35X models) and enhanced autofocus
- 23X version features noise reduction (DNR) and enhanced sensitivity; 35X features progressive scan and EIS (image stabilization)

Braving even the most extreme environments is simply routine for the SurveyorVFT-PRS Series of pressurized camera domes. With its pressurized interior of dry nitrogen gas, a regulating relief valve and a thermostatically-controlled heater/fan assembly, the camera, pan/tilt drive, receiver and CPU-based electronics inside the dome are protected in an ideal operational environment (IP67 rated). The result is that electronic and video components inside the dome do not suffer any of the accelerated deterioration that would occur under exposure to extreme elements.

The basic SVFT-PRS model provides video transmission over standard coaxial cable. In addition, interface boards are available to expand transmission options to include TCP/IP (using the ViconNet® platform), fiber-optic transmission or twisted-pair (UTP). A special wall mount and pipe adapter allow for mounting of the units.

Model Number	Product Code	Camera Type/Format	Optical Zoom/Total Zoom
SVFT-PRS22E/ SVFT-PRS22EC	8768/8768-01	Color with ExView Technology NTSC/PAL	22x/264x
SVFT-PRS23/SVFT-PRS23C	8769/8769-01	Color (Day/Night with Wide Dynamic Range) NTSC/PAL	23x/276x
SVFT-PRS35/SVFT-PRS35C	9103/9103-01	Color (Day/Night with Wide Dynamic Range and Image Stabilization) NTSC/PAL	35x/420x
Mounting Options		**Description**	
SVFT-PR-WMA	8381-01	Wall Mount; for SurveyorVFT Pressurized Domes, used to easily mount dome to a horizontal surface	
SVFT-PR-P	8382	Pipe Adapter; for SurveyorVFT Pressurized Domes, used to easily mount dome to a variety of SurveyorVFT mounts or a vertically oriented 1-1/2 inch NPT pipe	

VICON Powered by NET

Technical Specifications

ELECTRICAL

Drive Type: Electrical motorized pan and tilt with electronic control.

Camera Types: Units available in color and day/night (NTSC/PAL) formats and a variety of zoom and feature capabilities.

Input Voltage: 18-30 VAC. Will operate within spec on voltages up to 32 VAC. For voltages between 30-32 VAC, use a Class 3 indoor/dry or outdoor/wet power supply.

Current: 1.8 A with SurveyorVFT (coax, UTP, fiber); 2.3 A (ViconNet).

Power Consumption: 44 W with SurveyorVFT (coax, UTP, fiber); 54 W (ViconNet).

Heat Equivalent: 2.5 btu/min (0.6 kg-cal/min) with SurveyorVFT (coax, UTP, fiber); 3.1 btu/min (0.77 kg-cal/min (ViconNet).

Housing Connector: 23-pin, circular, pressure rated. Mating connector included for access to all SurveyorVFT signals including heater/blower, power, communications and video.

MECHANICAL

Application: Indoor or outdoor.

Mounting: Wall mounting with SVFT-PR-WMA Wall Mount or pendant mounting with SVFT-PR-P Pipe Mount.

Dimensions: Housing Diameter: 9.5 in. (241 mm).
Dome Diameter: 6.0 in. (152 mm).
Housing Height: 7.3 in. (185 mm).
Total Height: 10.2 in. (259 mm).

Weight: 7.5 lb (3.4 kg).
12.0 lb (5.4 kg) with SurveyorVFT included.

Construction: Plastic, cast aluminum; trim ring, cast zinc/aluminum.

Color: White housing and sunshield; black trim ring.

IP Rating: IP67.

ENVIRONMENTAL

Ambient Temperature and Humidity Range: -29° F (-34° C) to 165° F (74° C) in accordance with NEMA 2.1.5.1 STD2; -40 to 132°F (-40 to 55°C) continuous rotation. Up to 100% relative humidity, condensing.

Maintained Temperature and Humidity Range: 14° F (-10° C) to 140° F (60° C) maximum. Up to 90% relative, noncondensing.

Ingress Protection: EN60529, IP 67 rated.

HOUSING OPERATION

Pressurization: Schraeder type valve used to fill and drain housing with dry nitrogen gas. Relief valve automatically relieves pressure at 5- 7 psi (0.34-0.48 atm).

Operating Pressure: 1 - 5 psi (0.07 - 0.34 atm or bars) maximum.

Pressurization Volume: 28 ft^3 (0.008 m^3).

Low Pressure Indication: OSD message if pressure dips below 1/2 psig.

CAMERA MECHANISM OPERATION

Video Pan View: 360°.

Video Tilt View: -2.5° (-2.5° above horizon) to 92.5° (-2.5° past vertical).

Pan Speed: Variable, 0.1 to 360°/sec.

Autopan Speed: Variable, 0.1 to 42°/sec; enable/disable.

Tilt Speed: Variable, 0.1 to 150°/sec.

Zoom and Focus Speed: Less than 1.8 sec from end to end.

Sectoring: 16 max, programmable for size and titling; capability to be blanked out.

Preset Capabilities: 79 individual programmable preset positions.

COAXIAL/UTP VERSIONS

Control Protocol Hardware: Vicon's NOVA Matrix Switcher/CPUs, V1400X-DVC System Console and V1300X-RVC/-DVC keypad.

Control Protocol Software: Surveyor Direct Control program run on a standard PC type computer with an RS-422/485 half duplex protocol interface.

Compatible Competitive Protocols: Pelco, Sensormatic/AD, Ultrak, Philips, Kalatel, Cohu, Panasonic.

FIBER-OPTIC VERSION

Fiber Optic Receiver Specs:
Video: I/O Level: 1 V p-p.
I/O Impedance: 75 ohms.
Bandwidth: 8 MHz.
Differential Gain: 5%.
Differential Phase: 5°.
SNR: 60dB.
Data:
Data Rate: Up to 19.2 Kbps.
Optical:
Wavelength: 850/1300 nm.
Loss Budget (62.5 u): 12 dB.
Connector: ST.

VICONNET VERSION (LAN/TCP/IP)

Communication Protocol Hardware: Vicon's Kollector Digital Recorders and ViconNet Workstations.

LAN Interface: 100 Mbps, TCP/IP Unicast.

Connector Types:
Video Out: RJ-45 jack.
Network: Ethernet 100Base-T RJ-45 jack. 10/100 Mbps required for network connection.
Relay Output: 3-position removable screw terminal block.
Audio: 2 1/8-in. phono jacks.

Vicon, ViconNet and the Vicon logo are registered trademarks of Vicon Industries Inc. Copyright© 2009 Vicon Industries Inc. All rights reserved.
Vicon part number 8015-5052-06-00 Product specification subject to change without notice.

Video Surge Protection

Edco CX Series

CCTV & Data Applications/Coax

The Edco CX06-M & CX06-MI Surge Protective Devices (SPDs) implement three-stage hybrid technology. The SPDs address over-voltage transients with a primary Gas Discharge Tube (GDT), and secondary Silicon Avalanche Diode (SAD) components. Over-current protection, e.g. sneak and fault currents, are mitigated with solid-state resettable fuses — PTCs.

The Edco CX06-M & CX06-MI SPDs are designed in accordance with NFPA 780 (2004 edition) requirements, with up to 20 kA of surge current capability. The Edco CX06-MI model has an isolated ground and is recommended for use at the camera end.

UL® 497B

Features

- Sneak/fault current protection
- Low insertion loss
- Shielded case
- CX-06-MI has an isolated ground
- 5 year warranty

General Technical Specifications

Operating Voltage		5 VDC
Clamping Voltage		6 VDC
Operating Current		0.15 A
Peak Surge Current		20 kA (8 x 20 µs)
Frequency Range		0 to 20 MHz
Insertion Loss		< 0.1 dB at 20 MHz
SPD Technology		GDT, SAD, w/Series PTC
Connection Type		BNC, 50/75 Ohm
Operating Temperature		-40°C to +85°C
Dimensions (Inches)	M = 1.5H x 1W x 3.25L	MI = 1.5H x 1W x 4L
Weight		M = 2.3 oz MI = 3 oz
Certifications		UL 497B

Ordering Information

Head-End	CX06-M
Camera-End	CX06-MI

EMERSON
Network Power

Installation

Edco CX06-M: Head-End Equipment Protection

A. Connect the Edco CX06-M in line with the coaxial cable. The side labeled "EQUIP" should be connected to the adjacent head-end equipment.

B. Connect incoming coaxial cable to the side of the Edco CX06-M labeled "CABLE".

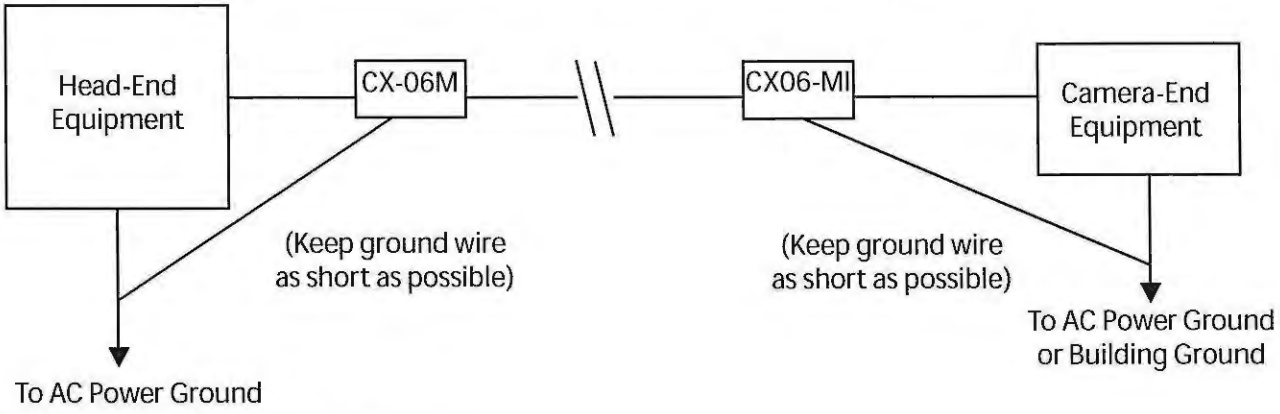
C. Connect a ground wire (10-12 AWG) between the Edco CX06-M ground terminal and the AC power ground of head-end equipment. Keep this wire as short and straight as possible.

Edco CX06-MI: Camera-End Protection

A. Connect the Edco CX06-MI in line with the coaxial cable. The side labeled "EQUIP" should be connected to the adjacent camera.

B. Connect incoming coaxial cable to the side of the Edco CX06-MI labeled "CABLE".

C. Connect a ground wire (10-12 AWG) between the Edco CX06-MI ground terminal and either the AC power ground or equipment building ground at the camera location. Keep this wire as short and straight as possible.



Read and Understand These Instructions:

These protectors are intended for indoor use on communication loop circuits which have been isolated from the Public Switch Telephone Network.

The communication loop circuits shall not be exposed to accidental contact with the electric light or power conductors. The protectors shall be installed per the applicable requirements of the National Electric Code, ANSI/NFPA 70.

Emerson Network Power.
The global leader in enabling Business-Critical Continuity™.

- AC Power
- Connectivity
- DC Power
- Embedded Computing
- Embedded Power
- Monitoring
- Outside Plant
- Power Switching & Control
- Precision Cooling
- Racks and Integrated Cabinets
- Services
- **Surge Protection**

Emerson Network Power Contact information

www.emersonnetworkpower.com

Headquarters
Surge Protection
328 Water Street
Binghamton, NY 13901
T: (607) 721-8840
T: (800) 288-6169
F: (607) 722-8713
E: contactsurge@emerson.com

650 SW 27th Avenue
Ocala, FL 34471
T: (352) 732-3029
T: (800) 648-4076
F: (352) 867-1237

EMERSON. Network Power

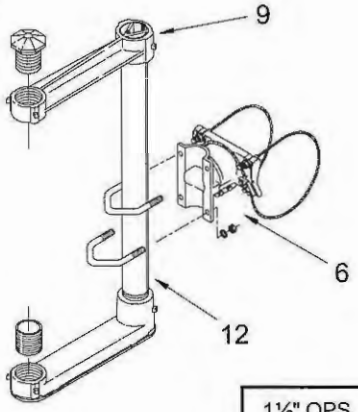
IO-50107 2/09 Rev. 2 Printed in USA

Business-Critical Continuity, Emerson Network Power and the Emerson Network Power logo are trademarks and service marks of Emerson Electric Co. ©2009 Emerson Electric Co.

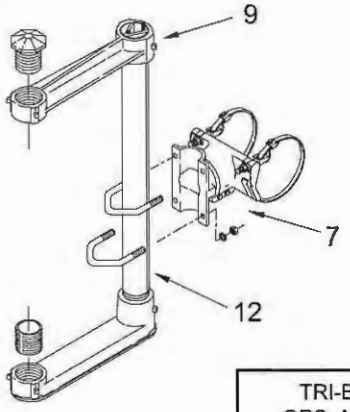
Mounting Bracket

pelco
PELCO PRODUCTS, INC.

Astro-Brac®
OPS BRACKET ASSEMBLIES

① 

1½" OPS ASSY.'S	
TUBE LENGTH	SIGNAL SECTION
50"	3
66"	4
82"	5

② 

TRI-BOLT OPS ASSY.'S	
TUBE LENGTH	SIGNAL SECTION
46"	3
58"	4
74"	5

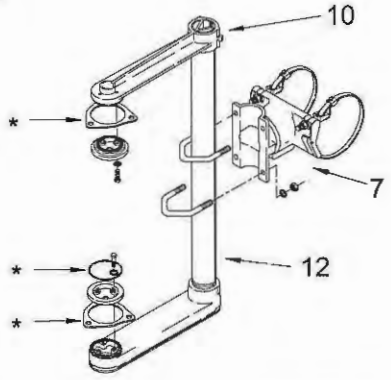
The Astro-Brac in its various configurations is a truly universal system for mounting signals.

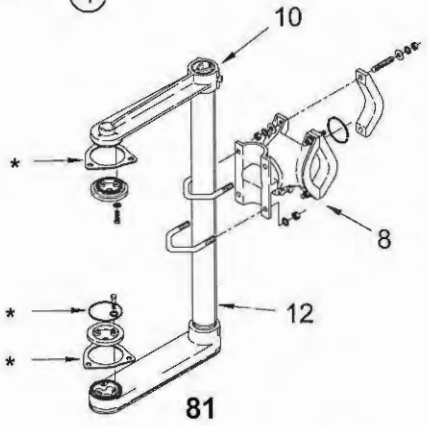
When mounting programmable signals set your sights on the most versatile mounting system. You will clearly see why the adjustability of the Astro-Brac fills the bill.

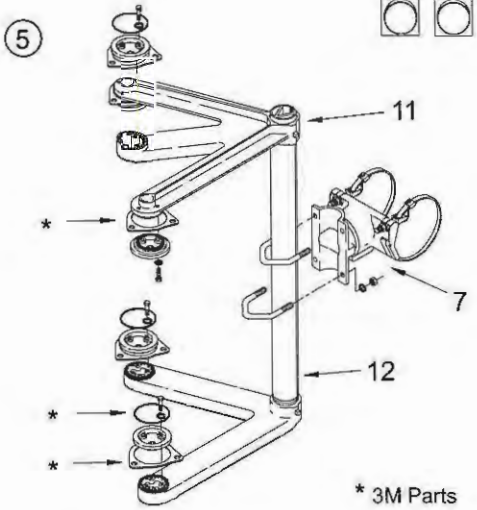
ITEM	DESCRIPTION	PART NO.
①	1-WAY OPS ASSEMBLY, Cable Mount	AB-0151-L-L
②	1-WAY OPS ASSEMBLY, Band Mount	AB-0152-L-L
③	1-WAY 3M ASSEMBLY, Band Mount	AB-0103-L-L
④	1-WAY 3M ASSEMBLY, Tenon Mount	AB-0143-L
⑤	5-SEC CLUSTER 3M ASSEMBLY, Band Mount	AB-0109-L-L-3M
6	ASTRO-BRAC CLAMP KIT, Cable Mount	AB-3009-L
7	ASTRO-BRAC CLAMP KIT, Band Mount	AB-3004-L
8	ASTRO-BRAC CLAMP KIT, Tenon Mount	AB-3010
9	ARM KIT, EXTENDED, 18½" CTC For Optically Programmed Signals	AB-5006
10	ARM KIT, 14", 3M	AB-5000
11	ARM KIT, 3M 5-Section Cluster	AB-5004
12	GUSSETED TUBE w/ Vinyl Insert	AB-2003-L

NOTES:

1. FOR ITEMS 1 & 2 PLEASE SPECIFY TUBE LENGTH & BAND OR CABLE LENGTH REQUIRED, i.e., AB-0151-50-62 FOR A 1-WAY 3 SEC. ASSEMBLY W/ 62" CABLE.
2. FOR ITEMS 3, 4, & 5 PLEASE SPECIFY TUBE SECTION & BAND LENGTH REQUIRED, i.e., AB-0103-3-29 FOR 1-WAY 3-SEC. ASSEMBLY W/ 29" BANDS.
3. SEE ASTRO-BRAC CLAMP KIT BULLETINS FOR BAND/CABLE LENGTHS AVAILABLE.
4. SEE ASTRO-BRAC TUBE BULLETIN FOR STANDARD TUBE LENGTHS.

③ 

④ 

⑤ 

* 3M Parts

320 S.W. 18th St. • Edmond, Oklahoma 73013 • (405) 340-3434 • FAX: (405) 340-3435 • E-mail: pelco@pelcoinc.com

Video Detection

1. Vehicle detection shall be accomplished with Iteris, Unitrac, or Autoscope video detection for all movements.

2. Equipment needed for the Iteris video detection:

   - 2 ea. – Vantage Edge 2 2N processors
   - 1 ea. – TS 2 IM BIU extension module
   - 1 ea. – Edge connect
   - 4 ea. – RZ4 Advance color cameras
   - 4 ea. – Pelco mast arm brackets
   - 1 ea. – 9" black/white video monitor
   - 1 ea. – Iteris DIN rail surge panel

Signal Equipment

1. Horizontal mounted polycarbonate signal heads with light emitting diodes (LED) indications.

2. Polycarbonate "count down" pedestrian signal heads with LED indications.

3. Lighted street named signs with LED indications.

4. Pedestrian push buttons shall be Polara Engineering, Inc. Bulldog LED display with audible tone "actuation confirmed."

5. Any new traffic signal installed will have a 6' x 6' system loop on all major street downstream lanes, 250' from the intersection. These loops will be furnished, installed, and hooked up inside the cabinet at no additional cost.